THE CYRAS-YRS: A VALIDATION STUDY OF A RISK-ASSESSMENT INSTRUMENT FOR YOUNG OFFENDERS

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Abstract

A substantial proportion of criminal offending, particularly serious offending, is perpetrated by a small group of repeat, serious offenders who continue offending over a long period of time, often beginning in childhood. The Youth Risk Screen (YRS) is an instrument designed to measure risk of recidivism for young offenders. In this study, the YRS was adjusted slightly for adaptation to CYRAS, a computerised database at the Child, Youth and Family service (CYF). The new instrument thus derived, the CYRAS-YRS, was then used to score the data for 425 cases from the CYRAS database. There were 190 females and 235 males in this study. The data were analysed in order to examine the psychometric properties of the CYRAS-YRS: first its reliability or internal consistency, and then its validity in predicting risk of reoffending.

The CYRAS-YRS was found to have suitable reliability, and was found to successfully predict offending, with a correlation of 0.311 ($p < 0.001$) with a general reoffending measure, and a correlation of 0.370 ($p < 0.001$) with a serious reoffending measure. Both primary school age risk factors and other risk factors were found to predict reoffending. However, it was also found that the relationship between primary school age risk factors and reoffending seemed to be mediated completely by the presence or absence of risk factors that can apply at any age and that most typically appear later during adolescence. All of these findings were true for both male and female young offenders, thus demonstrating that these findings were robust and consistent across different subgroups of the sample. Sex differences were minimal, and the CYRAS-YRS was successfully validated as a promising instrument for predicting risk of reoffending in young offenders of either sex.

1. Introduction

It is useful to have information about both adult offending and young offending in order to investigate patterns of offending across the life course. Historically, most of the data collected on criminal offenders in Western countries has involved adult offenders, i.e. offenders aged usually 18 or older. However, during the last few decades there has been an increasing amount of data available on antisocial behaviour committed by children and adolescents. Risk assessment for young offenders is a particularly important area because there is a subgroup who go on to become repeat serious offenders, and this subgroup causes a significant proportion of the damage to persons and property through crime. For example, Farrington, Ohlin and Wilson (1986) found that the most persistent 5-6% of offenders are responsible for about 50% of known crimes. Furthermore, whilst many young offenders do not go on to become career criminals, most repeat serious offenders began their offending at an early age. Zamble and Quinsey (1997) found that 83% of their sample of 311 adult male offenders were first in trouble with the law prior to age 18.

In New Zealand, Nadesu (2008) studied 5,000 offenders who were released from prison during 2002-3. Of these, 26% were re-imprisoned within the first year after release, 37% within two years and 49% within four years. Of those offenders aged under 20 at the time of release, as many as 70% were re-imprisoned and 87% were re-convicted within four years. In other words, recidivism is frequent for offenders in general, and even more frequent for young offenders in particular.

1.1 Age-crime curve.

It has long been observed that a greater proportion of offending occurs during adolescence. The following graph from Sampson and Laub (2005) illustrates what is often called

the age-crime curve. It shows the distribution of offenses by age for the longitudinal cohort group from Glueck and Glueck's (1950) study, which will be discussed in more detail below. The age-crime curve shows that offending peaks in adolescence and tapers off into adulthood.

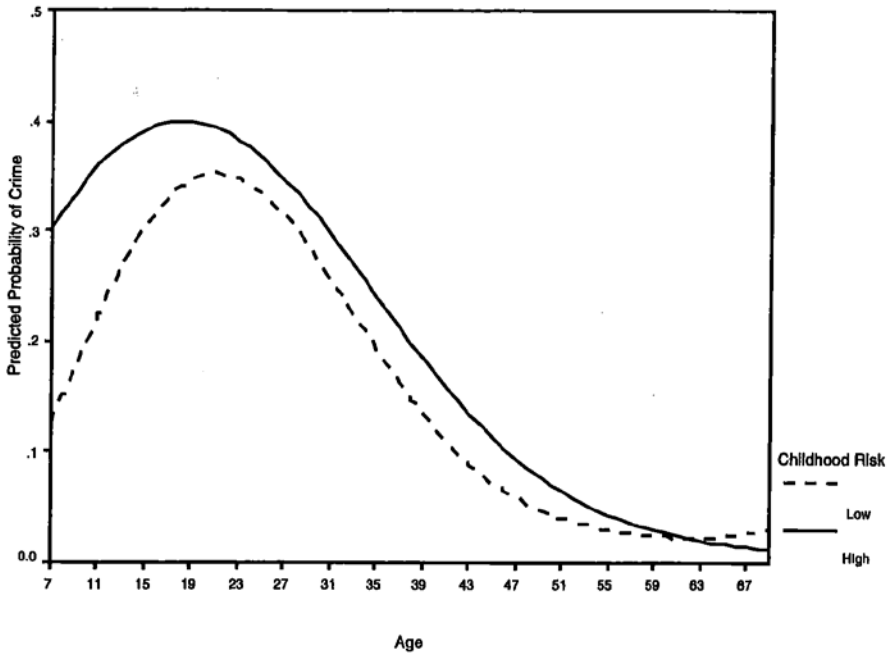

Figure 1.1: Predicted Total Offense Trajectories: Age Smoothed, Seven to Seventy, By Childhood Risk (taken from Sampson and Laub (2005))

Figure 1, above, provides a typical example of a widely established pattern in the relationship between age and crime. Criminal offending peaks at age 17, i.e. the number of 17-year-olds who are offenders is higher than at any other age. The most common age of first offending is 15-16. By age 28, almost 85% of former delinquents have desisted from offending (Blumstein & Cohen, 1987). There is a decrease from the peak on both sides of the age range, i.e. the further away from age 17, the lower the number of people who are offending at that age. This is illustrated in Figure 1, above, which shows that offending peaks in adolescence and tapers off into adulthood.

Blumstein, Cohen and Farrington (1988) found that, for a longitudinal Boston cohort, the total number of arrests decreased over time as the offenders aged through adulthood whereas the

number of arrests per active offender remained constant. This suggests that it is the proportion of persons in the population at each age who are offenders, rather than the number or frequency of offences per active offender, that varies over time based on the age involved. On the younger side of the curve, there are many first offenders during the high-risk age range, with a peak age of first offending of 15-16 as noted above. Therefore, the increase in offending during adolescence probably cannot be explained exclusively by an increase in frequency of offending by existing offenders.

There has been some suggestion that the age-crime curve could be explained exclusively by an increase during youth in the number of offences committed with co-offenders, potentially increasing the number of people arrested. This has been suggested on account of the idea that peer pressure might be more intense during adolescence. However, Stolzenberg and D'Alessio (2008) analysed 466,311 criminal arrests from seven US states, and found that the curvilinear relationship between age and offending applies for both solo offending and co-offending when the two are considered separately. Consequently, whilst the relationship between peer pressure and young offending may be of interest for other reasons, the greatly increased prevalence of offending during adolescence cannot be explained away simply by age differences in incidents involving co-offenders.

These findings support common knowledge that adolescence is a period of greatest risk for antisocial behaviour. However, by no means all (or even most) youth will come to the attention of police for antisocial activities. Moffitt, Caspi, Rutter and Silva (2001) found that approximately 84% of males have not been convicted by the age of 18, and approximately 80% are never convicted at all. If efforts are to be made to reduce crime, it is important to know which members of the young community are at risk, and to what degree.

1.2 Risk assessment.

Risk assessment for offending requires the identification of risk factors, i.e. features of the individual's behaviour or circumstances that are predictive of future offending. Risk factors have been identified across a number of domains, such as individual, family, peer and neighbourhood factors. Examples of highly predictive risk factors include antisocial cognitions and antisocial associates (Andrews & Bonta, 2003). A common finding across research in this area, which will be unpacked below, is that past antisocial behaviour is predictive of risk of reoffending.

An important principle in forensic psychology is the Risk Principle, which states that high-risk offenders are more receptive to treatment than lower-risk offenders (Andrews, Bonta & Hoge, 1990). This is particularly true for intensive treatments, perhaps in part because lower-risk offenders are more likely to develop further antisocial attitudes if they are exposed socially to higher-risk offenders. Furthermore, low-risk offenders are more likely to stop offending of their own accord, and hence, make poor candidates for preventive treatment. Being able to predict which individuals are likely to become repeat, serious offenders would contribute substantially to efficiencies in preventive treatment, in that it will identify those young offenders who are most likely to benefit from interventions. Furthermore, the younger high-risk individuals can be identified, the sooner intervention aimed at steering them away from a life of crime can be administered. It would be extremely useful to know how well high-risk individuals can be identified based on risk factors that are apparent early in childhood, and to find out how early on in an individual's life this information is typically available. Another advantage of identifying risk factors in young offenders is that risk factors often become targets for treatment, sometimes called criminogenic needs. This relates to the Needs Principle, which states that it is important to focus on information that is relevant to the person's offending (Andrews, Bonta & Hoge, 1990). For instance, antisocial associates and antisocial cognitions are relevant to a person's risk of

reoffending, whereas general life stresses such as depression are of virtually no relevance (Andrews & Bonta, 2003). This is not to say that offenders should be denied help with general life stresses, which is altogether a separate issue; the point here is that helping offenders with general life stresses is not sufficient in itself to address their offending. Specific risk factors that deal specifically with the person's offending need to be identified and targeted for treatment. Andrews and Bonta (2003) give the example that an offender might have a toothache; providing the offender with dental care may be a good and desirable and ethical thing to do, but it is not relevant to addressing their offending. The same principle applies to general life stresses.

A meta-analysis combines the results from multiple studies that examine closely related hypotheses. The statistical technique typically involves identifying a common measure of effect size, and modelling it using a form of meta-regression. The purpose of a meta-analysis is to increase the sample size and statistical power by analysing the results of multiple studies rather than just one. Andrews and Dowden's (2006) meta-analysis found that evidence supporting the Risk Principle is particularly solid for both female offenders and young offenders. Given the finding that the Risk Principle has been strongly supported for young offenders, it would be especially worthwhile to be able to predict risk from as young an age as possible. It would thus be desirable to know what types of factors are predictive of risk, and how early on in life they are able to be measured.

1.3 Risk factors.

One of the first studies to comprehensively examine risk factors was Glueck and Glueck (1950), who studied 500 delinquent and 500 non-delinquent male adolescents, and found that there were many significant differences between the two groups. Those in the delinquent group were much more likely to have a delinquent father, and also much more likely to have a gang association. Defiance, aggressiveness and lack of conscientiousness were marked features of the

delinquent group. Family factors that were identified included personal disorganisation; greater likelihood of frustration, resentment and destructive defiance; and a family environment less conducive to opportunities for learning self-control and impulse control.

There are some predictors of adult offending which are often identified at quite a young age. In particular, both Attention Deficit Hyperactivity Disorder (ADHD) and Conduct Disorder (CD) have been found to be predictive of later adult offending. Loeber, Farrington, Stouthamer-Loeber, Moffitt, Caspi and Lynam (2001) is one of the many studies that has found evidence of this. Moffitt and Lynam have proposed a model based on the observation that a significant proportion of chronic offenders had comorbid ADHD and CD during their childhood or/and adolescence. Lynam (1996) reviewed evidence concerning the comorbid CD/ADHD subtype of offenders and concluded that this group seem to be at particular risk of chronic offending. Lynam (1996) also stressed the need for early intervention for chronic offenders based on these and other findings.

CD and Oppositional Defiant Disorder (ODD) are two psychological constructs that pertain to antisocial behaviour committed by persons under the age of 18. Both of these disorders appear in the ICD-10 and DSM-IV. CD is characterised by violence towards people or/and nonhuman animals, arson/firesetting or other wilful damage of property, or/and theft or related deceitfulness. Other violations of major societal norms or rules, such as truancy and running away from home, are also common features of CD. In most cases, CD entails the young person having committed acts serious enough to constitute a criminal rights violation against persons, nonhuman animals or/and property. The DSM-IV defines childhood-onset CD as displaying at least one criterion prior to 10 years of age. ODD is a diagnosis given to adolescents who exhibit troublesome behaviours, but not to the degree required to qualify for a diagnosis of CD. ODD

entails a pattern of aggressive, hostile, disruptive behaviour that often involves defiance and rule-breaking.

In New Zealand, Wilson (2004) studied high-risk offenders and discovered a range of important findings. The Risk of Conviction and Risk of Imprisonment model (RoC*RoI), a risk assessment instrument commonly used by the Department of Corrections in New Zealand, was employed to determine which individuals would be suitable for this study. Incarcerated prison inmates with scores of over 0.70 on the RoC*RoI, which represents an approximate risk of 70% or greater of reoffending in a serious manner, met inclusion criteria for this study. A sample size of 149 participants was gathered, and 83% of participants were Maori. Sixty six percent of the sample were aged between 20-34, with a mean age of 27. Early antisocial behaviour was extremely common in this sample, with most of these high-risk individuals reporting early offending. The mean age of first contact with the Police was 11.3 years, with a standard deviation of 3.2 years. Commonly, when the participants were caught engaging in early antisocial behaviour, a Family Group Conference (FGC) was arranged in an attempt to deal with their offending. Sixty six percent of the participants were already engaging in repeated antisocial behaviour before the age of 13 years, with all except one participant engaging repeatedly in antisocial behaviour by the age of 17. Difficulties at school were common amongst the participants, with many of them dropping out of high school by the third form. Sixty six percent of participants reported being caught and punished for truancy, and 80% were suspended or expelled on account of being caught committing crimes or other disruptive behaviour. In 57% of cases, the reasons for suspension or expulsion included arson or/and violence. Most of the participants had a social network of antisocial associates, who would likely provide social reinforcement for antisocial behaviour and thus increase its appeal, as opposed to prosocial associates who would normally discourage antisocial behaviour. Eighty eight point five percent of participants had antisocial friends, whereas 82% had antisocial family members. Sixty four

percent of participants had a current or past gang association, and 29% were maintaining gang involvement while in prison.

There has been a greater volume of research conducted previously on risk factors for adult offending, thus making findings for adult offenders an informative starting point for identifying types of variables that are worth researching as potential risk factors for adolescent offending. Gendreau, Little and Goggin (1996) performed a meta-analysis to investigate risk factors for recidivism in adult offenders. Their age-related inclusion criterion was that the period during which recidivism was measured in the studies they reviewed needed to start when the offenders were at least 18 years of age. Cottle, Lee and Heilbrun (2001) conducted a meta-analysis to study risk factors for recidivism in adolescent offenders. The mean age of participants in the studies they reviewed was 14.71 at the time that risk factors were measured. In terms of ethnicity, 47.85% of participants were Caucasian, 38.18% were African-American and 18.00% were of other ethnic groups. 83.31% of participants were male, whereas the remaining 16.69% were female. Overall, the demographic characteristics of young offenders in this meta-analysis were thus not radically different from those of the population of young offenders in the US. Where Cottle et al.'s (2001) meta-analysis studied a sample that was primarily male, Hubbard and Pratt (2002) conducted a meta-analysis on risk factors for recidivism in adolescent girls. The figures from both Hubbard and Pratt's (2002) and Cottle et al.'s (2001) meta-analyses are weighted mean effect sizes. This refers to the mean effect size across all the studies in the meta-analysis, after controlling for the different sizes of the studies through weighing them by the inverse variance. The figures from Gendreau, Little and Goggin's (1996) meta-analysis for adult offenders are correlations with recidivism.

Table 1 summarises the results of these three meta-analyses by dividing risk factors into several different categories. Comparisons between groups are somewhat limited by the fact that

the exact same criteria have not been used across studies in these meta-analyses; for example, "social adjustment" and "social achievement" may not mean exactly the same thing, and may have been measured differently. Also, some items are only present in one or two out of the three meta-analyses, and the figures in the first column (adults) reflect correlations with recidivism whereas the other two columns reflect weighted mean effect sizes. However, some conclusions can be tentatively drawn based on the above statistics, comparing both between groups and within groups.

Table 1.1: Categories of risk factors by age and sex

Risk factor	**Adults (mostly male)**	**Adolescents (mostly male)**	**Adolescent (females**
Past antisocial behaviour			
Criminal history (adult)	0.18		
History of antisocial behaviour (preadult)	0.13		0.48
Age at first commitment		-0.346	
Age at first contact with the law		-0.341	
Conduct problems		0.255	
Length of first incarceration		0.187	
Number of prior commitments		0.174	
Type of crime		0.159	
Number of prior arrests		0.058	
Antisocial mental states			
Antisocial personality	0.18		0.21
Antisocial cognitions/beliefs			0.18
Antisocial influences			
Antisocial peers	0.18	0.204	0.53
Family criminality	0.12		
Family issues			
Parent pathology		0.047	
Family rearing practices	0.15		
Family structure	0.10		
Family problems		0.277	
Family relationships			0.17
Interpersonal conflict	0.15		
Single parent		0.070	
Number of out-of-home placements		0.184	
School issues			
School relationship problems			0.25
School attendance		-0.048	
Substance issues			

Substance abuse	0.14	0.149	
Substance use		0.014	
Demographic characteristics			
Age	0.15		0.09
Race/ethnicity	0.13	0.067	
Male sex/gender	0.10	0.111	
Socio-economic status	0.06	0.065	0.03
Intellectual/academic			
Intellectual functioning	-0.07		
Full Scale IQ		-0.142	-0.16
Verbal IQ		-0.111	
Performance IQ		-0.031	
Standardised achievement score		-0.153	
School report of achievement		-0.028	
Social/internalising			
Personal distress	0.05		
Self-image			0.13
Social adjustment			0.14
Social achievement	0.15		
History of childhood abuse		0.112	0.21
Anxiety			0.06
Miscellaneous			
Nonsevere pathology		0.305	
Severe pathology		0.069	
Effective use of leisure time		-0.233	
History of special education		0.130	
History of treatment		0.019	
Criminogenic needs	0.18		

Overall, a pattern emerges that a wide variety of different factors contributes to risk of recidivism. Very few differences are apparent based on sex/gender and age, suggesting that a similar range of risk factors may apply regardless of these two demographic characteristics. Across all groups, many of the biggest risk factors fall within the subcategory of past antisocial behaviour. Some contribution appears to be made by family issues and intellectual functioning issues, as well as antisocial peers and mental states, plus there are a number of miscellaneous risk factors.

There are many similarities between the risk factors that have been found for adult offending and young offending. The main differences, where there are any, seem to comprise differences in the specifics of a variable rather than more fundamental differences in the type of

variable. For example, one of the biggest risk factors for recidivism is past offending behaviour. For young offenders, the age at which a person commenced various levels of antisocial behaviour, as measured by such occurrences as imprisonment and police contact, is the largest manifestation of this type of risk factor. For adult offenders, past adult criminal behaviour appears to play a bigger role. For adult offenders, adult criminal history (0.18) was a somewhat bigger risk factor than preadult antisocial behaviour (0.13). This is a promising finding in terms of whether offenders can be treated by addressing current dynamic risk factors, and may reflect a more general trend whereby recent past behaviour may predict immediate future behaviour more strongly than distant past behaviour predicts it. An early age of commencement of offending appears to be a significant risk factor, and a possible explanation for this will be discussed below in the section on Moffitt's theory. Family-related risk factors will also be discussed further in this section. Mash and Barkley (2003) have identified difficult temperament as a risk factor for antisocial behaviour in children. Measures of aggressive and antisocial temperament are probably one of the best measures of risk during the early stages of life, whereas more acute and specific antisocial acts become increasingly apparent with age.

In terms of intellectual functioning, there was some indication that there might be minor risk factors in this area. The adolescent meta-analysis explored this area in the greatest detail, although the results seemed consistent across the three groups from these tentative findings. Verbal intelligence appeared to make a greater contribution to risk than performance intelligence did. This may reflect the usefulness of verbal intellectual reasoning to calculating long-term outcomes to one's actions. The lowest factor on the list for adolescents was substance use (only 0.014), as compared to substance *abuse* (0.149). This finding is noteworthy because it suggests that substance abuse is a risk factor whereas moderate substance use is not. Given this finding from a meta-analysis on adolescent offenders, it appears that moderate substance use is not an appropriate risk factor compared to abstention. In other words, having had an alcoholic drink

while under the legal age (which is typically around 18-21 or thereabouts) should not be considered to disqualify a respondent from being counted as abstaining from delinquency for research purposes.

Some of the terms from these meta-analyses are not entirely clear. “Nonsevere pathology”, for example, is so broad and vague a term that not much can be concluded from it. This category may include hyperactive-impulsive ADHD symptoms, which have been found by other research to be a risk factor. Carroll, Hemingway, Bower, Ashman, Houghton and Durkin (2006) compared the levels of impulsivity amongst three groups of adolescents: early-onset offenders, late-onset offenders, and those who had not offended. Participants were administered a number of psychometric assessment instruments, including the Risk-Taking Game and the Eysenck Impulsiveness Questionnaire. Early-onset offenders displayed more risk-taking and impulsivity than late-onset offenders, who in turn displayed more of each of these characteristics than non-offenders.

Recent reviews have identified a similar range of risk factors to the aforementioned meta-analyses. Douglas and Skeem (2005) found that various dynamic (i.e. potentially changeable) risk factors were predictive of recidivism. These include impulsivity, antisocial attitudes (antisocial cognitions) and substance abuse. Haines and Case (2005) studied a range of inter-related factors pertaining to the family environments of young offenders. Lack of parental supervision, poor emotional attachment (including parental rejection), harsh and inconsistent punishment, and parental relationship problems were all found to be risk factors. Criminal offending by parents was also found to be predictive of antisocial behaviour in young offenders.

Comparing the above meta-analyses, antisocial peers and past antisocial behaviour are risk factors for all groups, but may be particularly so for adolescent female offenders. History of childhood abuse may be a bigger risk factor for females, although this warrants more detailed investigation, including consideration of the different types of abuse. Hubbard and Pratt (2002) suggest that there may be sex/gender differences in the extent or manner in which school and family relationships, as well as a past history of being abused, contribute as risk factors. Overall, the risk factors for male and female offenders appear far more alike than different, although further research would be useful for some of the above items.

1.4 Sex/gender differences.

Due to the higher baseline prevalence of crime amongst males, many studies draw conclusions about offenders or young offenders in general based on mostly male samples. It is more difficult to find adequate sample sizes of female offenders, due to the lower prevalence of crime amongst females. Consequently, research findings on male offenders have been more readily available than findings on female offenders. It has been difficult to find opportunities to conduct quantitative research with sufficient sample sizes of female offenders, and thus much of the information about this group to date is fairly tentative and incomplete. Pepler, Madsen, Webster and Levene (2005) summarise research findings to date. Males are generally at higher risk for criminal offending than females, and this is especially true for overt and violent offending where physical force or confrontation is involved. Females may commit indirect, social aggression more often than males; also, females may solicit males to do their dirty work more often than the other way around. Considering sex differences within the subcategory of violent crime, Fletcher (2002) reports that female offenders tend to commit less serious violent crimes than male offenders, including in the context of domestic violence.

One major question with respect to sex differences is whether there is a "cycle of abuse" whereby some victims become perpetrators, and whether sex/gender makes any difference. White and Smith (2004) studied sexual offending and found that males who were physically punished, sexually abused or/and witnessed domestic violence during their childhood were more likely to commit sexual assault while at high school age. Also, the extent to which their participants offended sexually during adolescence was the greatest risk factor for subsequent adult sexual offending. Interestingly, White and Smith's (2004) study found that the extent to which the three childhood risk factors (physical punishment, sexual abuse and witnessing domestic violence) predicted adult sexual offending was mediated completely by whether they offended sexually during adolescence. In other words, none of the three childhood victimisation risk factors were predictive of adult sexual offending once the intermediary variable of adolescent sexual offending was controlled for.

White and Smith's (2004) study only included male participants. The finding thus cannot automatically be generalised to sexual assault or other offending by a female perpetrator. It would be interesting to study the same question with respect to females, though it would probably be challenging to accumulate a sufficient sample size of adolescent female sex offenders due to the low baseline prevalence rates of offending in females. In the meantime, the best tentative conclusion is to acknowledge a likelihood that adolescent offending behaviour is an intermediary variable between experiences of childhood victimisation and adult offending for females, whilst also acknowledging that the extent of such a potential intermediary effect requires explicit research. The variable of child physical or/and sexual abuse, which Hubbard and Pratt's aforementioned meta-analysis identified as possibly being a stronger predictor of offending in females than in males, may or may not be mediated fully in adult female offenders by the extent of their offending behaviour during adolescence.

Another important issue entails the question of whether, and to what extent, males may receive more social reinforcement than females for antisocial behaviour (perhaps especially during adolescence). Bukowski, Sippola and Newcomb (2000) found that attraction to aggressive peers increased upon entry into middle school. Attraction to peers who stood out or displayed leadership skills increased, whereas attraction to peers who showed good classroom behaviour decreased, as did attraction to peers who showed emotional vulnerability. This effect was especially marked for attraction to aggressive boys amongst girls, suggesting that this may be a factor in providing social reinforcement for adolescent boys to act aggressively.

To conclude, the research reviewed above shows that there are a wide range of potential risk factors for recidivism in young offenders. These include antisocial cognitions, antisocial associates, impulsivity, substance abuse and family-related risk factors. It is noteworthy that a number of different risk factors can be classified under the more general subcategory of past antisocial behaviour. The psychological constructs of ODD and CD involve past antisocial behaviour, and there are various ways to measure aspects of past antisocial behaviour: age at first Police contact, frequency and severity of past offending, theft from shops, etc.

An individual's level of risk reflects the combined effect of multiple risk factors. Risk assessment therefore involves assessing the presence or absence (and in some cases, the degree) of known risk factors, and combining this information to produce an overall risk level. This is normally done by creating risk scales, a process that will be discussed in detail below. Before doing that, however, it is worth considering theories that attempt to explain the known evidence on risk factors.

1.5 Moffitt's AL/LCP theory.

One of the earliest theories to emerge as data on young offenders became available was Moffitt's Life-Course Persistent (LCP) vs. Adolescence-Limited (AL) model of offending. A comprehensive early source for the LCP vs. AL taxonomy was Moffitt (1993). This theory was developed in part as an attempt to reconcile the continuity of antisocial behaviour over time (see earlier recidivism statistics) with the fact that it seems to peak quite distinctly during adolescence (as per the age-crime curve, discussed earlier). Moffitt postulates that there are two distinct groups, and that antisocial behaviour exhibits continuity for one group (LCP) and discontinuity for the other (AL). For non-LCP offenders, offending is limited to a particular time in their lives, usually adolescence. For LCP offenders, offending continues throughout their lifespan.

As noted previously, a significant proportion of offending is concentrated within a small group constituting around 5% of offenders. For this group, antisocial behaviour is very stable and persistent across time, context and situation (Moffitt, 1993). Moffitt proposes that this LCP group become repeat offenders due to the ongoing presence of risk factors internal to the individual, thus explaining why the LCP group appear to be insensitive to cues indicating a reduction in the external reinforcement available for antisocial behaviour. LCP offenders thus continue their offending into adulthood, whereas AL offenders desist due to a decrease in reinforcement (particularly external social reinforcement) for such. Also, LCP offenders seem to often behave antisocially both in situations where it is reinforced and in situations where it is not, whereas the antisocial behaviour of AL offenders is typically limited to specific contexts. Moffitt proposes that LCP offenders are characterised by individual and family risk factors starting early in childhood. Conversely, AL offenders are usually not exposed to many risk factors until they reach adolescence, when they are more likely to come into contact with antisocial peers and social situations where some short-term reinforcement is available for antisocial behaviour.

Moffitt (1993) notes that there are two types of neuropsychological deficits that have been established as risk factors for antisocial behaviour in children: executive functioning deficits (particularly hyperactive-impulsive type ADHD) and low verbal intelligence. The impairment to verbal intellectual functioning in antisocial children tends to be generalised across a wide range of areas including verbal comprehension, memory, problem solving and intellectual reasoning abilities.

Various family factors have been implicated. The earlier that a child is exposed to these risk factors, the greater the risk they pose. The first three years of life are a particularly sensitive period, and thus exposure to risk factors is especially problematic during this period. Family-related risk factors include family criminality and antisocial attitudes, parental substance abuse, and parental deficits in cognitive abilities and parenting skills. A toxic environment during pregnancy, such as substance abuse or domestic violence against the pregnant mother, is another risk factor. Moffitt (1993) notes that these family-related risk factors often co-occur, and that a child with cognitive deficits and other risk factors often has a parent or parents with similar difficulties.

Parenting style is another important area to consider. Deficiencies in attachment relationships, cohesiveness, and affection are risk factors whereas a warm, engaging and consistent parenting style is a protective factor. Harsh or/and inconsistent punishment, abuse and neglect, and low levels of supervision and non-punitive discipline have also been implicated. Patterson's coercion model is another issue worth considering: if a parent gives a misbehaving child a reinforcer as an attempt at appeasement, this can have the effect of increasing the likelihood of the child committing similar misbehaviour in the future. In other words, enabling or excessively permissive parenting may be a risk factor, especially if there is inconsistency or if one parent uses this and the other is harshly punitive.

Patterson, DeBaryshe and Ramsey (1989) outline a developmental model of antisocial behaviour, which postulates that the first step is ineffective parenting practices (such as those listed above). This negative early childhood environment can lead to childhood conduct problems, which in turn lead to subsequent problems such as academic failure and peer rejection. All of these risk factors thus increase not only the likelihood of committing antisocial behaviour, but also the likelihood of associating with antisocial peers, which becomes another risk factor for future antisocial behaviour (Patterson, DeBaryshe & Ramsey, 1989).

LCP offenders are typically exposed to multiple risk factors from early in childhood, whereas AL offenders are typically exposed to few risk factors in childhood. As one possible explanation for the increased prevalence of offending during adolescence, Moffitt talks about the "maturity gap", which involves a discrepancy between the range of reinforcers that adolescents often seek on account of their biological age and the social opportunities to acquire them. Moffitt lists alcohol consumption, driving, sex/relationships, marriage and the acquisition of wealth and property as examples of reinforcers to which access is limited for adolescents.

AL offending is thus postulated to often relate to attempts to acquire these reinforcers in ways that circumvent the conventional restrictions imposed on adolescents by society. This "maturity gap" hypothesis is speculative, and it is not yet clear how much it can explain the dramatic increase in offending during adolescence. Moffitt's LCP/AL model is a valid theory regardless of the exact reasons that offending is more common in adolescence, because her larger point is that LCP persons are a minority who offend even in the absence of whatever factors are elevating offending during adolescence.

Consistent with their lack of sensitivity to social norms against criminal offending, LCP offenders are more likely to commit offences that are serious in nature, whereas AL offenders are more likely to just dabble in comparatively less serious offences. In other words, the LCP group represent a small group of repeat, serious offenders who continue wreaking havoc on society throughout their lives for as long as they are able. Nagin and Land (1993) found that the frequency of offending decreased for both chronic (i.e., LCP) offenders and adolescence-limited offenders, but that the slope was sharper for adolescence-limited offenders.

A feature of Moffitt's taxonomy has been that social reinforcement from antisocial peers has been postulated to account, at least in part, for the fact that criminal offending peaks at age 17 and adolescence is the most common period of life for someone to commit offending for a limited period of time. In other words, social disapproval for antisocial behaviour may be less universal within at least some social groups with primarily or exclusively adolescent membership. Piquero, Brezina and Turner (2005) found that it is at least usually still possible for adolescents to mix with social groups that promote prosocial values and do not support antisocial behaviour. Whilst Moffitt initially wondered if adolescents who abstained from delinquency would suffer negative social consequences, this does not generally appear to be the case. Moffitt has subsequently acknowledged this (e.g. Moffitt, Caspi, Rutter & Silva, 2001). Rebellon (2006) found that vicarious reinforcement for delinquent behaviour by another person that receives social reinforcement may play a larger role than reinforcement of an individual's own delinquent behaviour.

1.6 Tests of Moffitt's theory.

A number of studies have been conducted to examine Moffitt's theory, and most of the evidence to date has been largely confirmatory. Ge, Donnellan and Wenk (2001) studied 4,146 juvenile male offenders who were committed to the California Youth Authority (CYA) in 1964

and 1965. They found a number of risk factors predicted later chronic offending in adulthood: cognitive ability, early alcohol abuse, young age of first arrest, and the number of early arrests. An adverse family environment was found to predict the timing and frequency of antisocial or delinquent behaviour during adolescence, rather than offending during adulthood. These findings are largely consistent with Moffitt's AL vs LCP theory, in that they confirm that risk factors from the individual's childhood predict offending that continues into adulthood. They also suggest the importance of future research to tease apart whether some risk factors (e.g. family-related risk factors) can predict the extent of offending during adolescence.

One study largely supported Moffitt's LCP vs AL theory, but expanded further on it by identifying five groups as opposed to Moffitt's three (LCP, AL, nonoffenders). Chung, Hill, Hawkins, Gilchrist and Nagin (2002) studied 808 youths in predominantly low-SES areas of Seattle. Semi-parametric, group-based modelling (SPGM) is a modelling technique that enables the identification of different groups, each with their own trajectory, to capture the variation in the data. Five groups were identified based on SPGM: nonoffenders, late onsetters, desisters, escalators and chronic offenders. Among initial nonoffenders at age 13, individual factors played the greatest role in determining whether they would become late onsetters or remain nonoffenders. Among participants already delinquent at age 13, peer, school and neighbourhood factors played the greater role in determining whether they would escalate or desist.

Participants were divided into a poor sample and a non-poor sample, based on whether their per capita family income was less than half of the median per capita income. The percentage of the poor subsample who fell into the chronic offender group was 45% greater than that for the non-poor subsample (8.6% versus 5.9%, respectively). The size of the nonoffender group differed only slightly between the nonpoor subsample (24.8%) and the poor subsample (21.6%). In other words, SES seemed to be only slightly predictive of differences between

offenders and nonoffenders, whereas SES was more strongly predictive of differences between chronic offenders and others.

Nine point nine percent of males vs. 4.1% of females fell into the chronic offender group, whereas 32.2% of females and 16.0% of males fell into the nonoffender group. Twelve percent of African-American youth, 7% of European Americans, 2% of Asian Americans, and 7% others were in the chronic offender group. Overall, Chung et al.'s (2002) results suggest that individuals who are at highest risk across multiple risk factors are more likely to fall into the chronic offender group.

To date, Moffitt's theory has been investigated for male offenders to a greater degree than female offenders, due to issues of sample size. However, what little is known to date about female offenders leans towards supporting Moffitt's theory to apply regardless of sex/gender, although with females being at lower risk of following the LCP path than males. Mazerolle, Brame, Paternoster, Piquero and Dean (2000) studied the offending patterns of persons with two or more police contacts in the Philadelphia area. Of their sample of 3,655 individuals, 13% were female. They found that male and female offenders did not differ markedly in their offence specificity; male and female offenders seemed to be quite similar except for the fact that female offending has a lower baseline prevalence. Mazerolle et al.'s (2000) results supported the more general premises of Moffitt's LCP theory: regardless of sex/gender, individuals whose onset of criminal offending was early in life and whose offending persisted into adulthood had a greater range and variety of offending.

Also consistent with Moffitt's LCP/AL theory, Fergusson, Horwood and Ridder (2005) found that children who had conduct problems at age 7-9 were much more likely to engage in antisocial behaviour as adults by age 25. The proportion of participants involved in property

offending was 3.4% for the least conducted disordered 50% of children at age 7-9, 8.5% for the 51-80% group, 15.0% for the 81-95% group and 17.4% for the 96-100% group (i.e. the most conduct disordered 5% of children at age 7-9). For violent offending, the proportions for each of these conduct disorder percentile groups at age 7-9 years were 3.2%, 6.4%, 11.6% and 34.8% respectively. Violent offending thus increased most markedly for the group that had the worst conduct problems at age 7-9.

It is useful to cross-reference Moffitt's theory with other theories covering related topics. One particular subcategory of individual factors that contribute to the LCP pattern may involve callous-unemotional (CU) traits, which entail a pervasive lack of empathy towards other persons (and nonhuman animals). Frick and White (2008) summarise findings to date and report that there is some evidence for the existence of a subgroup of young offenders who display CU characteristics. CU traits appear to be relatively stable over time for this group, and that this group are often implicated in serious acts of violence. Frick's investigation into CU traits is a new area of research, and that findings in this area to date are tentative.

Based on Moffitt's theory, risk factors that are present in early childhood are likely to be indicative of particularly high risk, compared to the same risk factor being present during the generically higher risk period of adolescence. Most Adolescence-Limited offending is not committed before the age of 14 years, and thus it is particularly important to identify high-risk offenders by the age of 10-12 years at the latest. Frick also suggests that the age of eight is a good age to treat young offenders, in terms of their responsiveness to treatment. For both these reasons, it is important to identify antisocial behaviour early in childhood for those cases where it is present.

1.7 Methods of research on risk factors.

Having established promising avenues of investigation into risk factors, the next issue to be considered is how to measure them. To date, there has not been much research in the area of young offenders in New Zealand, and thus there is plenty of scope for research to be conducted in this area. Hannah-Moffat and Maurutto (2003) argue that, even internationally, there is a need for more research specifically in the area of young offenders. Risk and risk/needs assessment instruments are at times used without having been sufficiently validated for the specific population being dealt with. It would be helpful to undertake more research that specifically develops valid instruments for risk assessment with young offenders in New Zealand.

It has been established that actuarial risk measures are far superior to clinical impressions in measuring the risk of criminal offending and recidivism. Andrews and Bonta (2003) review findings in this area and report that the correlations between actuarial prediction and recidivism were much higher than the correlations between clinical judgement and recidivism. The differences were r = 0.39 vs. 0.03 for general recidivism, 0.30 vs. 0.09 for violent recidivism, and 0.42 vs. 0.11 for recidivism with respect to sex offences. It is likely that the inferior performance of clinical judgement reflects cognitive biases and other errors in human judgement, combined with the fact that an offender typically does not display enough evidence in a face-to-face interview to be able to discern their level of risk. Mills (2005) notes that actuarial risk assessment methods have been developed precisely in order to avoid these limitations in human interpretation.

Given the higher accuracy of actuarial risk measures, psychometric assessment instruments are a promising avenue of research on risk assessment, if they can cover a good range of the aforementioned risk factors. Face to face clinical interviewing does have the advantage that the interviewer can keep asking follow-up questions until they get the right

information, but this does not cover much additional scope than can potentially be covered by pre-designed risk assessment questions. Overall, there is good reason to believe that the advantages of face-to-face interviewing over computerised data records are fairly minimal, given the very limited utility of the mostly extraneous additional information that can be discovered through clinical interviewing.

Furthermore, there are a number of specific advantages to using psychometric assessment instruments. A central focus in the discipline of psychology involves applying scientific methods to subject material that is by its nature often immensely complicated, intangible and difficult to quantify. Psychometric assessment instruments can very substantively mitigate this challenge by providing tangible measurement standards, thus utilising a formal structure. The criteria used in good psychometric assessment instruments are tangible rather than abstract, and are classifiable, allowing for precise empirical measurement. Instruments are thus a very solid quantitative way to measure the data concerned.

Conversely, face-to-face interviewing allows for more qualitative input. Everything from the interviewee's body language to their tone of voice, how often they hesitate, whether they change their story, and all manner of other things that contribute to an intuitive clinical judgement can be observed. However, given the above statistics on actuarial measures vs. clinical judgement, the extra information from face-to-face contact appears to be of little value.

The data that can be obtained for instruments are more objective in nature, and are less prone to all the various cognitive biases that can get in the way of a human (even a qualified and trained one) making interpretive social judgements based on intuition. The extra contextual information provided by a face-to-face interview will often be "noise" rather than "signal", even if not invariably so. Whilst there is potential for some useful information to be overlooked due to

the absence of face-to-face input data, this is not a huge concern. The relevant information can be obtained most accurately from actuarial measures such as risk assessment instruments.

Having a pre-determined template of questions from a psychometric assessment instrument helps to ensure that the same information is measured for each case, thus providing a reliability advantage over unstructured assessment. An instrument provides the opportunity to utilise known risk factors, which can be identified empirically, as has been done in the field of young offenders and forensic psychology generally. Instruments impose a structure to the assessment, and are also efficient and well-suited to testing hypotheses. Furthermore, instruments provide quantification, which supports the development of weightings for different items and scales, and tells the assessor how much weight to give different things in developing a risk appraisal for the individual. Without quantification, there would be a lot more guesswork involved in determining what weightings to give to items.

1.8 Psychometric assessment instruments.

Some instruments (such as the RoC*RoI) focus on “adult offenders”, or in other words, a general population sample of offenders with respect to age. Whilst there will be some overlap with a young offender population (since criminal offending peaks at age 17), there will also be older offenders in the population and thus the match is not exact. Instruments dealing specifically with young offenders are thus more suitable.

One specific reason why instruments designed for adults are likely to be unsuitable is that they tend to ask questions about how lengthy one’s criminal history is. For young offenders, the frequency and severity of recent offending is more applicable; in other words, the right type of variable (past offending) could be measured by the wrong specifics if an adult instrument was used. Some of these items are pretty important, and instruments can lose significant amounts of

predictive power if the wrong questions are used. Another difference between young offenders and adults is that the same behaviour can be processed differently by society (e.g. by the courts) depending on the age of the person committing the action(s) concerned.

Even amongst those instruments designed for adolescents, there are some shortcomings with respect to risk assessment. Some instruments are designed for an adolescent population, but focus on properties of interest which are peripheral to predicting the risk of recidivism for young offenders. For example, the Prison Youth Vulnerability Scale (PYVS) (Tie & Waugh, 2001) measures internalising difficulties such as vulnerability and suicide risk. There are various instruments designed to measure general life functioning issues or mental health issues, such as the Millon Adolescent Clinical Inventory (MACI) (Millon, 1993).

Other instruments have sections that bear some relevance to antisocial behaviour in children, but the main focus of the instrument is fairly cursory to predicting risk of recidivism. For example, the Child Behavior Checklist (CBCL) (Achenbach, 1991) includes some questions on antisocial behaviour but is mostly designed as a preliminary screening instrument to measure general life functioning. The Psychopathy Checklist: Youth Version (PCL-YV) (Forth, Kosson, & Hare, 2003) measures psychopathy or callous-unemotional traits. Some instruments are relevant to young offenders, but perform poorly at predicting risk. For example, Ashford and LeCroy (1988) attempted to validate the Wisconsin Juvenile Probation and Aftercare Risk instrument, and found that only one of its eight variables was significantly related to recidivism.

Gendreau, Little and Goggin's (1996) aforementioned meta-analysis on adult offenders found that psychometric assessment instruments, which comprise multiple risk factors, produced higher correlations with recidivism than any single risk factor by itself. The Level of Service Inventory: Revised (LSI-R) performed best ($r = 0.35$). Consequently, the Youth Offender Level

of Service Inventory (YO-LSI) warrants some consideration for measuring risk. Another instrument which has some merit is the Structured Assessment for Violence Risk in Youth (SAVRY). Meyers & Schmidt (2008) tested the SAVRY with a sample of 121 young offenders and found Receiver Operating Characteristic (ROC) values between 0.68 and 0.80 across different offence types and follow-up periods.

When considering which instruments are most suitable, the criteria to take into consideration include the following:

- Rationale/purpose/uses of instrument
- What types of respondents (what populations) does the instrument pertain to?
- What age range? -> Quite a few instruments for adults, not as many for youth
- What does the instrument measure?
- Which risk factors? Static/dynamic?
- Weighting/scoring? (Scales can be developed based on this)
- How was the instrument derived?
- How comprehensive is the instrument?
- How relevant to property of interest? (e.g. PCL-YV)
- How does the instrument measure the property of interest?
- Data files (e.g. police, social work)
- Face to face interviewing (YP, family members, friends, teachers, etc)
- How much validation has been performed on the instrument so far?
- Properties -> reliability/validity etc (if known) -> if relevant to measuring risk of reoffending for young offenders; is there scope for validating this instrument with respect to such a purpose?

1.9 Youth Risk Screen (YRS).

The Youth Risk Screen (YRS) is a recently developed instrument that summarises a good range of risk factors for recidivism based on current best practice. It incorporates current knowledge, including Moffitt's AL/LCP theory as well as research findings covering many of the risk factors discussed above. Some of the items in the YRS attract higher scores if the risk factor was present from a younger age, thus acknowledging the higher risk posed by LCP individuals.

The YRS was designed for the specific purpose of measuring risk of recidivism for young offenders, which is the desired goal of the present research. This instrument is not divided into subscales; it measures only a single variable (risk of recidivism). It contains questions that are likely to overlap well with the type of information that social workers typically record in their case files, such as questions about misbehaviour at home or at school.

The type of information which the YRS measures is largely behavioural. This means that certain relevant areas, such as antisocial cognitions and lack of victim empathy or remorse, are not covered. Overall, the fact that the instrument is a behavioural measure is advantageous, because most of the best predictors of recidivism are publicly observable actions that have been committed by the young offender. Past behaviour is typically the best predictor of future behaviour, both generally and with respect to antisocial behaviour.

Many of the questions in the YRS concern subcategories of past antisocial behaviour or likely indicators thereof, such as past court and police contacts, past stealing from home and shops, school expulsion, complaints about bad behaviour at school, and frequency and severity of past offending. Other predictors of recidivism, such as antisocial associates and gang associations, impulsivity and hyperactivity, defiance and rule-breaking, and abuse of alcohol and

other drugs are also covered in the YRS. Overall, the questions in the YRS match very closely with risk factors that have been identified from research, as summarised above.

1.10 The present research.

To date, very little is known about the performance of the YRS. To the author's knowledge, the YRS had not yet been evaluated as of 2004, when collection of data for this project began. Consequently, a validation study is needed to examine the psychometric properties of this instrument, and assess its performance in predicting recidivism in young offenders.

Various options were considered for how to validate the YRS. This instrument was originally designed to be scored from face-to-face clinical interviews with both the young person and a parent or caregiver, but with corroboration of facts from other sources such as official records. However, conducting face-to-face interviews with young offenders would pose issues with limited sample sizes, particularly for young female offenders. Alternatively, sourcing information from a computerised database would provide a good option for acquiring high sample sizes, particularly since it would enable oversampling of female young offenders. Some instruments, such as the Psychopathy Checklist (PCL), are at times scored purely from records.

The YRS is well suited to processing information from computerised data files, because it deals with tangible material facts. This instrument is compatible with social work records, and social work records are a good place to look for the kind of information that is covered by the questions in this instrument. CYRAS is a database of young persons and their families who have had contact with Child, Youth and Family Services, a social work oriented government department in New Zealand. The CYRAS database contains records of information about young persons and their families who have had contact with the service.

The CYRAS database contains the kind of information that can readily be used to score a test off, and the kind of information that matches well to the questions in the YRS. There is a significant degree of overlap between the kind of information that social workers typically record in CYRAS as part of their usual activities and the kind of information covered by the YRS. CYRAS has exact dates for its entries, and the information in the CYRAS records is well structured. Furthermore, CYRAS contains records from an early age, thus covering the preadolescent years during which criminal convictions are rare or non-existent. The inclusion of the preadolescent years is extremely useful for collecting data in order to investigate the extent to which an offender follows the LCP path.

There are two types of entries: Youth Justice (YJ) and Care and Protection (CP). YJ entries pertain to antisocial behaviour committed by the young person; this is almost invariably in the form of a conviction for a criminal offence. CP entries are a more general category, covering mostly everything which does not fit the criteria for a YJ intake, with the central focus being on care and protection needs. Usually, CP entries pertain to the care and protection of the child themselves, but they can also contain information about the care and protection of others.

Consequently, CP entries (especially at a young age) sometimes contain information that is relevant to antisocial behaviour committed by the child whose file they are contained in. When it comes to antisocial behaviour committed at a young age, often this is actually covered in a CP intake, due to issues of both age and low severity. Also, a number of risk factors for offending (e.g. substance abuse, truancy, etc.) fall within the scope of CP intakes. It is thus important to read all records, both YJ and CP, when conducting forensic psychology research using CYRAS. The YJ intakes are often easier and more straightforward to interpret.

Information on most of the questions in the original YRS is likely to be found in CYRAS records, but several questions needed to be modified in order to make the instrument fully compatible with CYRAS. The original, face-to-face interview version of the YRS will henceforth be referred to as the Interview-YRS. The modified instrument, the CYRAS-YRS, contained 18 questions as opposed to the 24 questions in the original version of the YRS. This is because the original YRS contained a number of duplicate questions; that is, the same type of material is requested from the young person in one question and from their caregiver in another question. For example, Question 3 asks the caregiver whether the young person has ever run away from home, whereas Question 4 asks the young person this very same question. Weightings on some questions needed to be configured for CYRAS.

Three of the questions in the CYRAS-YRS were divided into two parts. For Q6, one part pertains to antisocial associates and the other to gang association. For Q17, one part asks about frequency, and the other about severity, of past offending. Question 1 contains a part that asks about past YJ system contact, in addition to its original Interview-YRS question about prior offending-related Family Group Conferences (FGCs) prior to age 14. This question on YJ system contact addresses the same type of content area (i.e. past offending behaviour) that a number of other YRS questions address, but is included in the CYRAS-YRS because it measures this property of interest in a way that's specific to the CYRAS database. Consequently, the CYRAS-YRS contains a total of 21 sub-questions within its 18-question structure.

In the present study, all of the participants will have at least one YJ intake during 2002, and information about them will be measured as of the person's last YJ intake in 2002. After using the YRS to score cases from CYRAS, the participants will be followed up in order to measure the extent to which they reoffend from 2003 onwards. The expectation is that there will

be a statistically significant correlation between total CYRAS-YRS scores and recidivism during the follow-up period. Scores for each individual question on the YRS will also be analysed.

There were some preliminary results from other research which indicated a likelihood that the CYRAS-YRS would prove to be a promising instrument for measuring risk of recidivism. The scores for 38 cases for whom original YRS (i.e. face-to-face interview YRS) scores were known were independently obtained from CYRAS for those individuals, using the CYRAS-YRS. A correlation of 0.74 was found between the original YRS scores and the CYRAS-YRS scores for those 38 cases. (Grace, McLean & Warren, 2006)

Another interesting preliminary result was that a correlation of 0.14 ($p < 0.01$) was found between Interview-YRS scores and a reoffending measure for a sample of 391 cases. This sample comprised 222 participants in the Reducing Youth Offending Programme (RYOP), plus 169 referrals to this programme who were not accepted by it. The reoffending measure comprised a binary scale that entailed a score of 1 for participants who received either a subsequent conviction or a subsequent YJ intake, and a score of 0 for participants who did not receive either of these two indicators of reoffending. (Grace, McLean & Warren, 2006)

The current project sought to investigate the psychometric properties of the CYRAS-YRS instrument. The properties studied included the internal consistency and factorial structure of the scale, as well as its predictive validity with respect to predicting reoffending based on computerised data records on the CYRAS database. This project aimed to explore which CYRAS-YRS items predicted reoffending, and whether these risk factors are applicable to both male and female cases, as well as whether there appear to be any pertinent sex differences.

2. Method

2.1 Participants.

The participants in this study were 425 adolescents from the CYRAS database at Child, Youth and Family Services. Initially, cases were selected randomly from a national database of young persons who had undergone at least one YJ intake with CYFS during the year 2002. A stratified random sample was used; that is, the sampling was random except that the frequency of certain demographic characteristics within the sample was proportional to the frequency in the population it was sampled from, i.e. the national database (CYRAS). In other words, the sample was representative of the target population with respect to certain strata or demographic criteria. This stratified random sampling yielded 235 males and 55 females. An oversampling of another 135 females, also randomly selected except for their being female, was then used in order to increase the sample size of females in the study.

This resulted in a sample size of 235 males and 190 females. For the female sample, the mean age was 15.6 years, with a standard deviation of 0.98 years, at the time of their 2002 reference date. The age range was 12.41 to 17.62 years. Most of the 190 female cases were either NZ Maori (n=99) or Caucasian (n=59). The ethnicity of the remaining 32 female participants was described as Cook Island Maori (n=5), Samoan (n=2), Other European (n=1), Other (n=4) and Unknown (n=20).

For the male sample, the mean age was 15.7 years, with a standard deviation of 1.13 years, at the time of their 2002 reference date. The age range was 6.29 to 17.65 years, with one case missing from this calculation. Most of the 235 male cases were, as with the female cases, either NZ Maori (n=80) or Caucasian (n=72). The ethnicity of the remaining 83 male participants was described as Cook Island Maori (n=4), Samoan (n=8), Other European (n=2),

Niuean (n=4), Tongan (n=3), Fijian (n=1), Other Pacific Island (n=2), Vietnamese (n=1), Chinese (n=1), Other Asian (n=1), Other (n=3) and Unknown (n=53).

Approval was provided by Child, Youth and Family Services for this data to be collected, provided the confidentiality of participants was respected. No participant has been, or will be, individually identified.

2.2 Measures.

Two types of measures were used for each participant. Firstly, each participant's risk level was measured using the CYRAS-YRS. Secondly, each participant's reoffending was measured over the period 2003-5. This yielded two primary measures, risk level (as measured by Total CYRAS-YRS score) and level of reoffending, which were cross-referenced and compared, and a correlation was calculated. This was the main analysis. Additionally, further analyses were conducted on the reliability and validity of the CYRAS-YRS, based on more detailed information collected about its component questions.

A number of measures of reoffending were initially considered. In the end, two measures were used for reoffending during the follow-up period. The first such measure, Conv/YJ, was scored either 0 or 1 for each case, based on whether or not the person had received either any further criminal convictions or/and any further YJ intakes during the follow-up period (2003-2005). If the person had neither received any further criminal convictions nor any further YJ intakes, they were scored 0. If they received one or more convictions or/and one or more YJ intakes during the follow-up period, they were scored 1. The second reoffending measure, Conv-Serious, was scored the same way and differed only in that it pertained to serious reoffending only, whereas Conv/YJ pertained to general reoffending.

The original version of the YRS was designed for purposes of information gathering that included face-to-face interviewing of the young offender and his/her family. Modifications of the YRS were undertaken in order that the instrument could be scored without interviews, based solely on information recorded in CYRAS files. For example, the original version of the YRS asks about the proportion of the respondent's friends who are antisocial, whereas the question on antisocial associates was modified to a yes/no format for the CYRAS-YRS. A copy of the original Interview-YRS can be found in Appendix B, whereas a copy of the CYRAS-YRS can be found in Appendix A.

Each case was scored by researcher interpretation based on information in case files, typically recorded by social workers for purposes of working on the individual case. As a result of the latter, the information recorded on the CYRAS database was expected to overlap significantly, though not perfectly, with the kind of information that would be prioritised for the purposes of risk assessment.

The CYRAS database has two types of intakes: Youth Justice (YJ) and Care & Protection (C&P) intakes. Every case had at least one YJ intake, since the cases were drawn from a sample of offenders. Some cases also had C&P intakes. The researcher examined every record, including both YJ and C&P intakes. Useful information was found in both. The amount of time to complete each case varied considerably, ranging from only a few minutes up to several hours. This is because some cases had only one or two brief YJ entries, whereas other cases had large volumes of information.

2.3 Procedure.

The researcher was provided with a list of cases, identifiable by their CYRAS identification number. These cases were taken from a national sample of young offenders with at

least one conviction in 2002. For each case, the researcher would open that case's file and read through it searching for any information on the CYRAS-YRS questions.

The data in the CYRAS case files was largely of a qualitative nature, and was not neatly structured in a form easily conducive to being configured with quantitative criteria such as those in the YRS. It was necessary to read through each file extensively and make a determination on whether there was positive evidence pertaining to each CYRAS-YRS question. Possible scores on CYRAS-YRS questions ranged from 0-5 depending on the question, with a higher score indicating a greater level of the risk factor concerned. In the event that no discernible information was available in the CYRAS file on a particular question for a particular case, the lowest possible score (usually 0) was given by default.

The lowest score that it is logically possible to get on the CYRAS-YRS is 2 out of 68. This is because 1 is the lowest possible score for two of the questions, whereas zero is the lowest possible score for every other question. The reason why a score of zero is not possible on two of the questions is due to the population that the sample is drawn from; every participant had committed at least one recent offence, which made a score of zero logically impossible for this population on two of the questions. After collecting the data, the scores for each item were typed into an Excel spreadsheet, and total scores calculated for each case. Further data analysis was performed in SPSS.

Data was also collected for a number of reoffending measures, in order to cross-reference this information on future reoffending with the risk-prediction information that had been collected using the CYRAS-YRS. Reoffending measures included the type of offending (either general or serious), number of convictions, number of court appearances, and total seriousness. Also, the most serious offence in the follow-up period was measured for each case, based on the

mean length of prison time that was typically received for a conviction for the most serious offence category.

2.4 Comparison with Interview-YRS.

In addition to the primary study of the 425 CYRAS-YRS cases, another 143 cases of data were collected based on face-to-face clinical interviewing. The original, face-to-face version of the YRS (the Interview-YRS) was the instrument used for this purpose.

Data were available for 115 Programme cases and 28 Comparison group cases. The Programme cases were individuals who had been selected for treatment by the Reducing Youth Offending Programme (RYOP) on account of their high risk scores on the Interview-YRS. The RYOP was designed to treat young offenders who were found to be at high risk, as per the Risk Principle. The Comparison group cases were other cases with high Interview-YRS scores who were included in the study for the sake of comparison.

A preliminary analysis (detailed below in the Results section) found that the distribution of scores between the 115 Programme cases and the 28 Comparison group cases were fairly comparable. Consequently, a decision was made to combine these two groups and perform analyses on all 143 Interview-YRS cases. Analyses were performed to examine both the reliability and validity of Interview-YRS cases.

As described above, the 425 cases for the CYRAS-YRS were selected on a mostly random basis from across a national database of offenders. The non-random aspects of this selection process involved procedures like oversampling cases from particular geographic areas (e.g. Auckland, Christchurch), and thus the sample was very close to random and representative. The 143 Interview-YRS cases, by comparison, comprised young offenders who were found to be

at high risk, based on their Interview-YRS scores. Consequently, the range of scores for the Interview-YRS was expected to be higher, as well as more truncated, than the range of scores for the CYRAS-YRS.

To explain more about the context that led to the data collection for the Interview-YRS cases, and the higher range of scores for this group compared to the national sample used for the CYRAS-YRS cases, a study called the Reducing Youth Offending Programme (RYOP) was conducted at a similar time as the data collection for the present study. The RYOP used the Interview-YRS as a screening instrument to determine which cases warranted inclusion in the RYOP (a treatment programme) based on scoring highly on this instrument. High Interview-YRS scores were thus explicitly a characteristic feature of the 115 Programme cases. As it turned out, the mean for the 28 Comparison cases was slightly higher than the mean for the 115 Programme cases, and thus a high range of scores can be considered a feature of the combined group of 143 Interview-YRS cases.

A number of analyses were performed to examine the reliability and validity of the CYRAS-YRS and Interview-YRS. More detailed attention was given to the CYRAS-YRS, since this was the primary instrument being studied. Basic analyses were performed for both versions of the instrument. These included item-total correlations to measure internal consistency, as well as measurements of predictive validity based on the correlation between instrument scores and reoffending measures. More detailed analyses for the CYRAS-YRS cases included Exploratory Factor Analysis (EFA) as well as comparisons between males and females. Since the sample sizes for females (190) and males (235) were fairly similar, this also loosely resembled split-half reliability testing, with a key difference that the split was pre-determined by sex rather than random.

By making comparisons between the CYRAS-YRS and the Interview-YRS, this served as a measure of the convergent validity of the CYRAS-YRS. In other words, this comparison served to explore the degree of agreement between measurements of the same trait obtained by different approaches that were intended to measure this trait. Construct validity was measured by examining the item-total correlations. If a test has construct validity, scores on the individual test items should correlate highly with the total test score. This is evidence that the test is measuring a single construct.

An advantage of this study was that there was no cutoff mark, such as "high risk" being over a certain score. Instead, risk scores were measured as integer figures on a continuum, and correlations performed on them. This allowed for more detailed analyses to be performed, and provided freedom from constraints by arbitrary pre-determined categories.

Below is a list of the topic areas covered by CYRAS-YRS items:

Table 2.1: Topic areas covered by the CYRAS-YRS

Q1a	Youth Justice (YJ) system contact on CYRAS
Q1b	Family Group Conference (FGC) < age 14
Q2	AWOL (delinquent absence) from home
Q3	Stealing from home
Q4	Expulsion from school
Q6a	Antisocial associates
Q6b	Gang association
Q7	Truancy from school
Q8	Impulsivity
Q9	Hyperactivity
Q10	Liar (primary school age)
Q11	Primary school behaviour
Q12	Defiant or argumentative (primary school age)
Q13	Rule breaking (at primary school)
Q14	Police apprehension
Q15	Drug abuse
Q16	Theft from shops
Q17a	Frequency of past offending
Q17b	Severity of past offending
Q18	Alcohol/drug use

The full wording of the CYRAS-YRS items (questions) can be found in Appendix A, where the CYRAS-YRS instrument is presented in full.

3. Results

The Results section begins with descriptive statistics of the scores obtained on the CYRAS-YRS instrument. Then an analysis of the reliability of this instrument follows. This is followed by an analysis of the instrument's validity, particularly its predictive validity in measuring risk of future recidivism.

3.1 CYRAS-YRS scores.

In order to examine the instrument's internal properties, the scores on individual items were converted into 1s and zeroes for some analyses. For the items on police apprehension and frequency of past offending, which had a minimum score of 1 for the sample, a score of 1 was converted into a zero whereas a non-minimum score was converted into a 1. Calculations were then performed on these converted scores of 1s and 0s.

The lowest possible score that is logically possible on the CYRAS-YRS for these 425 participants, all of whom had at least one YJ intake during 2002, is 2. The highest score that is logically possible is a full score of 68. For the general population, the range of possible scores would be 0-68. This is because two CYRAS-YRS items each had a minimum score of 1 for anyone who has a YJ intake, but a minimum score of 0 for the general population (which includes nonoffenders).

Figure 3.1 shows the distribution of Total scores on the CYRAS-YRS instrument for the whole sample (n=425):

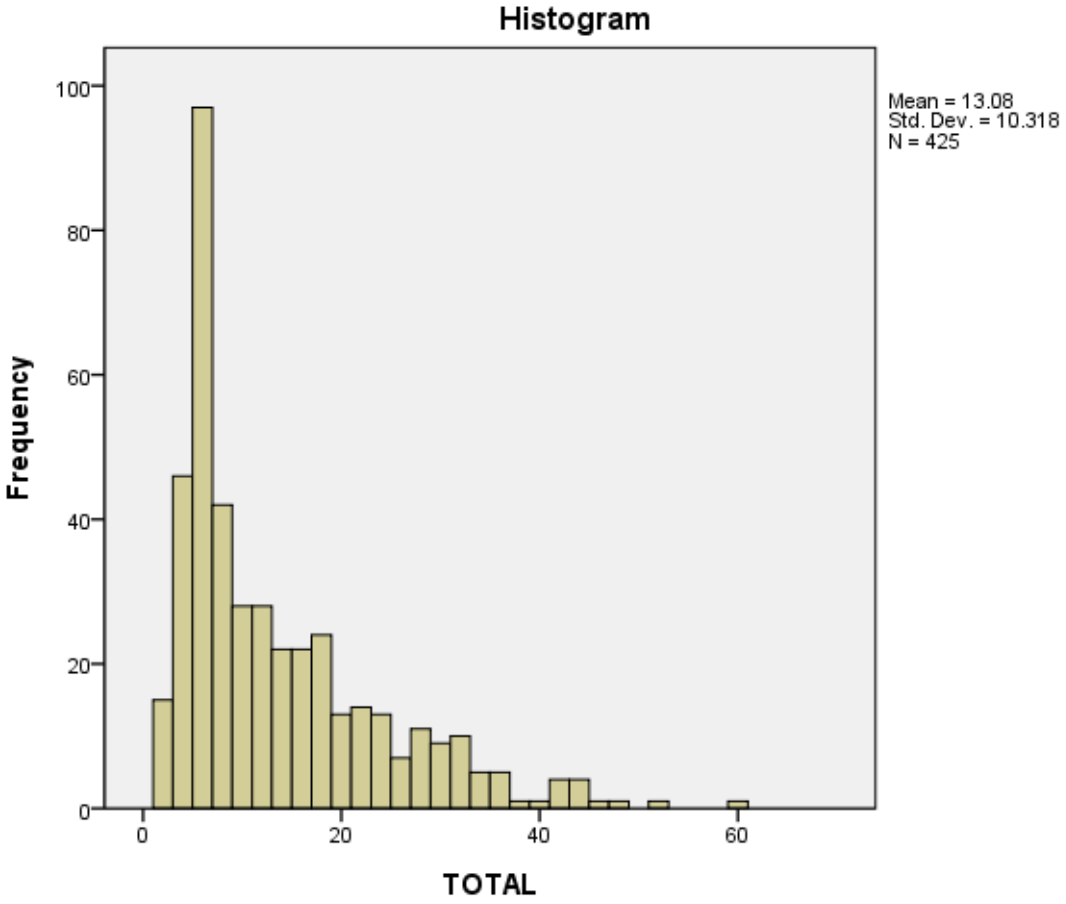

Figure 3.1: Distribution of Total CYRAS-YRS scores

The mean for the entire sample was 13.08 (SD 10.32). The 25th percentile score (lower quartile) was 5, and the 75th percentile score (upper quartile) was 18. The sample was approximately normally distributed, except with a low median (9) and mode (5), and a skew towards a longer tail on the high end of the distribution.

3.2 Total scores by sex.

Figure 3.2 shows the distribution of Total CYRAS-YRS scores for males and females:

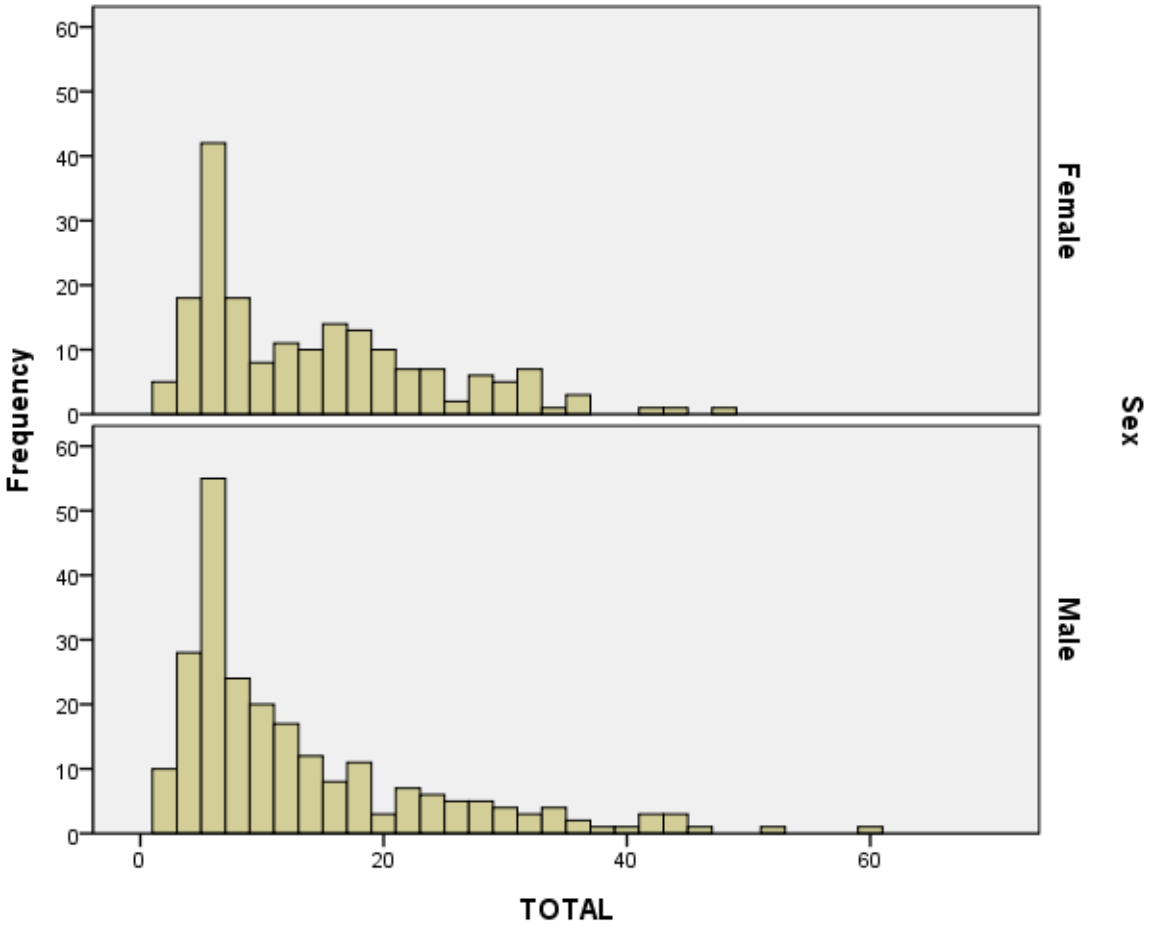

Figure 3.2: Distribution of Total CYRAS-YRS scores by sex

Comparing the 190 female cases with the 235 male cases, the distributions for each sex were fairly similar. The median was 11 for the female cases and 9 for the male cases. The female cases had a mean of 13.63 and a SD of 9.598, whereas the male cases had a mean of 12.65 and a SD of 10.865. In other words, the distributions for each sex were of a similar shape, with the females scoring slightly higher than the males on average, and the male scores being slightly more spread out.

A t-test was performed to compare the distributions for females and males. The difference between the means was 0.98, with a standard error of 1.01 for this difference. The significance level of this difference was 0.331, which is not statistically significant. In other

words, the range of scores for females was slightly higher than for males, but not to a degree that was found to be statistically significant.

For each of Scales 2-4 in the Interview-YRS, a score below 10 was considered to be relatively low risk, whereas a score above 15 was considered to be relatively high risk. A total YRS score below 30 would thus be considered relatively low risk. The distribution of CYRAS-YRS scores in the present study was thus quite broad, with a low mean. The fact that the variance of scores was decent suggests that this sample is useful for measuring the instrument's reliability.

3.3 Reliability of the CYRAS-YRS (Scale Development).

For the reliability analysis, Q5 ("adult court") was removed from the analysis because all 425 cases scored 0 for this item. Thus, twenty of the 21 items were retained for the reliability analysis. Item-total correlations, exploratory factor analyses, and Cronbach's Alpha were computed to test the reliability of the CYRAS-YRS.

3.3.1 *Item-total correlations*

These were calculated for each of the 20 items after item scores were converted to 0s and 1s. The item-total correlations were computed using the variable "TOTAL", which refers to the total CYRAS-YRS scores. The following table displays the results for the item-total correlations, and the percentage of participants who scored zero on the dichotomised form of each of these variables.

Table 3.1: Item-total correlations for the whole sample (All) and by sex and percentage of the sample endorsing each item

CYRAS-YRS items	All	%	Female	%	Male	%
Q1a YJ contact	0.471	68.5	0.448	68.9	0.490	68.1
Q1b FGC <14	0.325	98.8	0.306	98.9	0.339	98.7
Q2 AWOL home	0.636	70.8	0.592	62.6	0.683	77.4
Q3 steal home	0.364	91.1	0.245	89.5	0.461	92.3
Q4 expel	0.579	89.6	0.515	88.9	0.629	90.2
Q6a antisocial associates	0.383	19.3	0.429	16.3	0.351	21.7
Q6b gang assn	0.385	91.3	0.389	87.4	0.394	94.5
Q7 Truant school	0.709	67.5	0.747	58.9	0.690	74.5
Q8 impulsivity	0.425	94.4	0.273	98.9	0.521	90.6
Q9 hyperactivity	0.450	91.3	0.228	97.9	0.573	86.0
Q10 Liar	0.537	88.7	0.309	90.5	0.685	87.2
Q11 primary school behavior	0.740	75.1	0.693	78.4	0.776	72.3
Q12 defiant	0.704	79.8	0.635	78.9	0.757	80.4
Q13 rule breaking	0.658	89.2	0.645	87.9	0.672	90.2
Q14 police apprehension	0.431	90.3	0.350	92.1	0.486	87.7
Q15 drug abuse	0.652	62.8	0.718	60.5	0.597	64.7
Q16 theft shops	0.558	64.9	0.480	56.8	0.622	71.5
Q17a frequency past offending	0.628	73.4	0.608	68.9	0.646	77.0
Q17b severity past offending	0.248	7.3	0.252	6.3	0.243	8.1
Q18 alcohol/drug use	0.639	55.3	0.718	53.2	0.578	57.0

All of these item-total correlation figures were positive, ranging from 0.23 up to 0.76. Furthermore, all of these correlations were highly significant ($p < 0.003$). This suggests that all of these 20 items are making a useful contribution to the instrument to at least some degree.

Where correlations are comparatively low for a particular item, it is worth looking in more detail at responses for each sex for that item, in order to determine whether floor or ceiling effects are having an impact. A very high or very low percentage score suggests that this may be an issue. Q1b FGC < 14 has a very high proportion of zeroes for both sexes, and the items on impulsivity (Q8) and hyperactivity (Q9) have a very high proportion of zeroes amongst the female cases. Therefore, in some cases a particular item may be making a stronger contribution than its comparatively low correlation would otherwise suggest.

For the group of 20 correlations comprising all 425 cases, the mean was 0.53 with a SD of 0.14. The item-total correlations tended to be somewhat higher for males, to a somewhat greater degree than could be expected purely on account of the sample size of 190 females and 235 males. Furthermore, there are clear sex differences for some items, although in some cases this may be an artefact of floor and ceiling effects.

There were four items where males scored higher than females by a greater difference than 0.20: stealing from home, impulsivity, hyperactivity, and Liar (primary school age). All four of these items were endorsed by only a small number of female cases, and thus the apparent sex difference is confounded. The correlations for males and females were within 0.15 of each other for the other 16 items, although females scored higher by over 0.10 on some items and males on others. Females had higher correlations than males on only four items: antisocial associates, truancy, drug use, and alcohol/drug use.

3.3.2 *Exploratory Factor analysis*

In order to determine the number of factors underlying the scores on the CYRAS-YRS, an exploratory factor analysis was conducted. A scree plot of the loadings is shown below, demonstrating the Eigenvalues of the components:

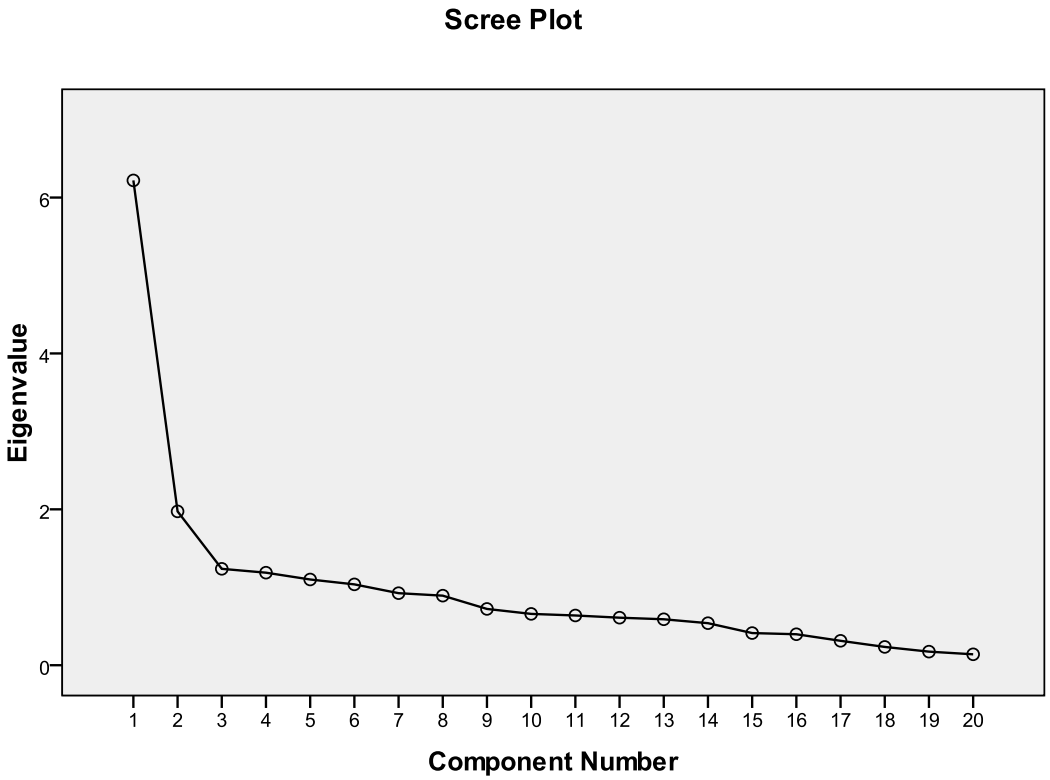

Figure 3.3: Scree plot of Eigenvalues

Because there is a discontinuity in the scree plot between Components 2 and 3, two factors were retained for subsequent analyses. One is stronger than the other (Eigenvalue of 6.22 for Component 1 and an Eigenvalue of 1.97 for Component 2). In other words, there appears to be a primary factor and a secondary factor within the CYRAS-YRS. Component 1 accounted for more than 30% of the variance in the Total CYRAS-YRS scores, while Component 2 accounted for only about 10%. Table 3.2 below shows the variance accounted for by the Components obtained:

Table 3.2: Variance accounted for by components obtained

Component	Eigenvalue	% of Variance	Cumulative %
1	6.220	31.099	31.099
2	1.974	9.868	40.967
3	1.237	6.183	47.150

Two factors were extracted using the method of Principal Axis Factoring. The factor loadings were then rotated using two methods: both a Varimax (orthogonal, i.e. uncorrelated) and Promax (oblique) Factor Analysis were performed. Here are the results from the Varimax and Promax Factor Analyses:

Table 3.3: Factor loadings from the Varimax and Promax Factor Analyses

	Varimax Factor Analysis		Promax Factor Analysis	
	Factor 1	Factor 2	Factor 1	Factor 2
Q1a YJ contact	.477	.256	.469	.116
Q1b FGC <14	.208	.301	.145	.266
Q2 AWOL home	.594	.190	.625	-.002
Q3 steal home	.273	.204	.251	.132
Q4 expel	.321	**.591**	.184	**.554**
Q6a antisocial mates	.389	.025	.441	-.115
Q6b gang assn	.360	.099	.384	-.020
Q7 Truant school	.675	.208	.714	-.013
Q8 impulsivity	-.025	**.802**	-.282	**.922**
Q9 hyperactivity	-.010	**.789**	-.260	**.901**
Q10 Liar	.321	**.423**	.236	**.363**
Q11 primary school beh	.450	**.612**	.327	**.530**
Q12 defiant	.485	**.525**	.394	**.418**
Q13 rule breaking	.389	**.574**	.268	**.510**
Q14 police apprehension	.305	.289	.261	.216
Q15 drug use	.682	.182	.730	-.044
Q16 theft shops	.572	.227	.588	.048
Q17a frequency past offending	.551	.300	.541	.138
Q17b severity past offending	.417	.188	.422	.060
Q18 alcohol/drug use	.647	.095	.716	-.130

For both the Varimax and Promax Factor Analyses, a similar range of items load more strongly onto Factor 2 than Factor 1. For Q4 Expel, as well as Questions 8-13, the loadings on Factor 2 were both reasonably high, and higher than their loadings on Factor 1. For most other

items, the loadings on Factor 1 were higher, consistent with the higher overall contribution being made to the instrument by Factor 1. In the above table, Factor 2 loadings are highlighted where they are both above 0.35 and also higher than the corresponding Factor 1 loading for the same item.

In interpreting the two factors, note that items that loaded on Factor 2 are almost all items that explicitly relate to early childhood (primary school), whereas those that loaded more on Factor 1 could be endorsed based on events anytime in the youth's life up until the assessment was conducted. The exception is Item 4 (expulsion from school), which could occur anytime but loads primarily on Factor 2. Moreover, as will be discussed further below, the items and their loadings seem closely aligned to theory (Moffitt, 1993). These results were one factor which influenced the decision to divide the items into Anytime and Primary School categories for the purposes of examining the instrument's validity (see below).

3.3.3 *Cronbach's alpha (a coefficient of reliability)*

The Cronbach's alpha for the 425 cases on these 20 items was 0.872. When removing any one of the 20 items from consideration, the Cronbach's alpha score varied between 0.858 and 0.872, which is a small difference, and suggests that the structure of the instrument is not heavily dependent on any one item. When the scores are converted to 1s and 0s (to avoid unequal influences based on how the items are weighted), the Cronbach's alpha is 0.877, and varies between 0.878 and 0.865 when any one item is deleted. When considering only the 190 female cases, the Cronbach's alpha was 0.854, whereas it was 0.893 when considering only the 235 male cases.

Cronbach's alpha can range from 0 to 1, with a higher score being desirable. A widely accepted standard is that Cronbach's alpha should ideally be above 0.7. Nunnally (1978) is one prominent author who recommends that the Cronbach's alpha figure for a scale should be above

0.7. When alpha is 0.7, the standard error of the measurement will be over half (0.55) of a standard deviation. A Cronbach's alpha of 0.872 is very good, and suggests that the different items in the instrument are measuring related concepts that correlate positively with each other to form one single construct. Likewise, this appears to be the case for both the male and female groups of cases when considered separately.

The Cronbach's alpha for the six items that constituted the Primary School factor (i.e. Q8-13) was 0.790. For Q4 Expel plus Q8-13, the Cronbach's alpha was 0.822. For the Anytime items (i.e. all items except Q8-13 and the defunct adult court) the Cronbach's alpha was 0.865. All of these figures are quite high, suggesting that each of the two variables (Primary School and Anytime) are comprised of items which cluster well with each other. As noted previously, the overall Cronbach's Alpha for all items was 0.872.

3.3.4 *Results from the Interview-YRS*

Some data were collected for face-to-face YRS cases at a similar time that the author was collecting data for the 425 CYRAS-YRS cases. The purpose of this face-to-face YRS data collection was to determine the suitability of referees for the Reducing Young Offending Programme (RYOP), an intervention designed to address chronic offending problems for high-risk cases. The Interview-YRS cases can thus be divided into a Programme group and a Comparison group. The lowest possible score on the Interview-YRS is zero, and the highest is 72 (24 on each of Scales 2-4). Scale 1 on the Interview-YRS is scored from 0-6, but does not count towards the total score, because this scale is purely for evaluating reliability rather than measuring risk.

The Interview-YRS has a number of items that are essentially duplicates; the same question is asked of both the young person and the parent/guardian. Thus, the Interview-YRS has 24 items compared to 21 items for the CYRAS-YRS.

Questions 2, 4, 5, 8, 10 and 12 of the Interview-YRS are "duplicate" questions, and are scored 1 if the two information sources agree and 0 if they don't. These six items comprise Scale 1 of the YRS. The other three scales (Scales 2-4) score positively where risk factors are endorsed. Scale 1 is designed to measure reliability, whereas Scales 2-4 are designed to measure risk of reoffending.

Given that data had already been collected for the Interview-YRS, analyses were performed on this data for the sake of comparison between the two versions of the YRS instrument. Data are available for 115 Programme cases. The lowest actual score for the programme cases was 17, and the highest was 67. The mean was 43.85, and the s.d. was 10.25. This sample was approximately normally distributed, with a high mean and a skew towards a longer tail on the low end of the distribution.

In addition to the Programme cases, 28 other face-to-face interview cases were available. This group of 28 cases was labelled the Comparison group. A series of analyses were performed to compare the 115 Programme cases with the 28 Comparison cases, in order to determine the level of similarity between the two groups with a view to performing analyses on all 143 cases as a single group.

Here are the means of the scores for each scale:

Table 3.4: Mean scores from Programme cases and the Comparison group

	Programme cases (n=115)	**Comparison group (n=28)**
Scale 1	5.19	5.07
Scale 2	11.09	13.68
Scale 3	15.39	17.39
Scale 4	12.18	13.00
Total	43.85 (SD 10.25)	44.94 (SD 12.75)

The mean for the Comparison group was 44.94, with a s.d. of 12.75. For Scale 1, the mean for the Comparison group was 5.07, compared to 5.19 for the Programme case group. For Scale 2, the mean for the Comparison group was 13.68, compared to 11.09 for the Programme cases. For Scale 3, the mean for the Comparison group was 17.39, compared to 15.39 for the Programme cases. For Scale 4, the mean for the Comparison group was 13.00, compared to 12.18 for the Programme cases.

Overall, the results for the Comparison group were slightly higher than those for the Programme cases. The Programme cases were expected to have high scores, since they reflected cases that were rated high enough risk to warrant intervention. Likewise, it is not surprising that the Comparison group cases have high scores, given that there was initially a requirement for Comparison group cases to have similar YRS scores to the Programme group. Given the similarity between the two groups, they were merged into a combined group of 143 cases for further analyses. For this combined Interview-YRS group of 143 cases, the mean was 44.89 with a s.d. of 10.94.

The Interview-YRS contains 24 items, from which the CYRAS-YRS was developed. The items on the Interview-YRS and the CYRAS-YRS overlap very strongly, and most of the items examine the same property of interest. Comparisons can thus be made between the results from the two instruments where items are similar.

First, item-total correlations were computed as presented in Table 3.5, comprising only items appearing in both the Interview-YRS and the CYRAS-YRS:

Table 3.5: Item-total correlations for CYRAS-YRS and Interview-YRS cases

CYRAS-YRS items	All	Female	Male	Interview
Q11 primary school behavior	0.740	0.693	0.776	0.446
Q7 Truant school	0.709	0.747	0.690	0.038
Q12 defiant	0.704	0.635	0.757	0.387
Q13 rule breaking	0.658	0.645	0.672	0.439
Q15 drug abuse	0.652	0.718	0.597	0.171
Q18 alcohol/drug abuse	0.639	0.718	0.578	0.231
Q2 AWOL from home	0.636	0.592	0.683	0.382
Q17a frequency past offending	0.628	0.608	0.646	N/A
Q4 expel	0.579	0.515	0.629	0.423
Q16 theft from shops	0.558	0.480	0.622	0.287
Q10 Liar	0.537	0.309	0.685	0.352
Q1a YJ contact	0.471	0.448	0.490	N/A
Q9 hyperactivity	0.450	0.228	0.573	0.409
Q14 police apprehension	0.431	0.350	0.486	-0.016
Q8 impulsivity	0.425	0.273	0.521	0.356
Q6b gang assn	0.385	0.389	0.394	N/A
Q6a antisocial associates	0.383	0.429	0.351	0.305
Q3 steal from home	0.364	0.245	0.461	0.351
Q1b FGC <14	0.325	0.306	0.339	0.192
Q17b severity past offending	0.248	0.252	0.243	N/A

In general, the distribution of correlations for the Interview-YRS did not closely match that for the CYRAS-YRS. In addition, the Interview-YRS item-total correlations were substantially lower than the CYRAS-YRS item-total correlations. Police apprehension and Truancy were especially low for the Interview-YRS cases; Truancy scored much higher on the CYRAS-YRS (0.709) compared to the Interview-YRS (0.038). This is one piece of evidence which suggests that Truancy may be acting as a proxy variable for other risk factors on the CYRAS-YRS (see Discussion).

The Cronbach's alpha score for the 115 Programme cases was 0.516. This figure is substantially lower than the Cronbach's alpha score of 0.872 for the 425 CYRAS-YRS cases. For the combined 143 interview-based cases, the Cronbach's alpha score was 0.718. When removing Scale 1, the other 18 items produce a Cronbach's alpha score of 0.734 for the 143 interview-based cases. This is a reasonably good Cronbach's alpha, but it is still significantly

lower than the figure for the 425 CYRAS-YRS cases (0.872). In other words, the Interview-YRS performed reasonably whereas the CYRAS-YRS performed exceptionally well in terms of the inter-relatedness between items on the scale.

A series of factor analyses were performed for the Interview-YRS cases. The results were not noteworthy, except for the fact that they did not endorse the two-factor structure that was observed for the CYRAS-YRS. The items which came through most strongly on the second factor for the Interview-YRS factor analyses did not resemble the cluster of items that comprised Factor 2 of the CYRAS-YRS.

3.4 Validity.

To assess the validity of the CYRAS-YRS, a series of analyses were performed. These included correlations with reoffending measures, ANOVAs, and mediation analyses using partial correlations.

A decision was made to divide the CYRAS-YRS items into two factors as part of the analysis of this instrument's validity. This was a subjective decision, but it was informed in part by the results from the Factor Analysis of the CYRAS-YRS. The two factors were labelled Primary School and Anytime. Another reason for this division was that Moffitt's Life-Course Persistent vs. Adolescent-Limited taxonomy suggests that risk factors tend to be present earlier than adolescence for the most serious and chronic offenders.

The Primary School variable comprised a total of the scores from Questions 8, 9, 10, 11, 12 and 13 from the CYRAS-YRS. These items pertained to impulsivity/ recklessness, hyperactivity, liar (primary school age), complaints from primary school teachers about behaviour at school, argumentativeness/defiance, and rule-breaking at primary school. The

Anytime variable comprised all the other items in the CYRAS-YRS. In other words, the Primary School variable concerned risk factors that are apparent by primary school age, whereas the Anytime variable concerned risk factors that may not appear until adolescence.

The CYRAS-YRS is designed to measure risk of reoffending. Consequently, data were sought pertaining to reoffending during the follow-up period after 2002. A single measure was used to determine whether or not a person had reoffended: if a participant had either any further YJ intakes or any further convictions, they were considered to have reoffended. If they had not had any convictions or YJ intakes after 2002, they were considered to have not reoffended. The 425 CYRAS-YRS cases were thus given a Reoffending score (YJConv) of either 0 or 1 accordingly.

Here are the basic descriptive statistics for the Reoffending, Primary School and Anytime variables:

Table 3.6: Means and standard deviations of Reoffending, Primary School and Anytime variables

	Mean	Std. Deviation	N
TOTAL	13.08	10.318	425
Conv/YJ	.65	.478	425
Primary School	1.88	3.604	425
Anytime	11.20	7.638	425

The Anytime score is the highest. This reflects the fact that it comprises 15 items, compared to just six for the Primary School variable; and also, the fact that Primary School risk factors had a low base rate amongst this sample.

Of the 425 cases, 275 scored 1 for Conv/YJ whereas 150 scored 0. That is, 65% of the sample were found to have reoffended. Given the high numbers of participants in each condition (150 and 275), other analyses could be conducted without concern for ceiling or floor effects.

In order to explore the relationships between the variables, a series of analyses were performed, beginning with inter-item and item-total correlations:

Table 3.7: Inter-item correlations for Reoffending, Primary School and Anytime variables

	TOTAL	Conv/YJ	Primary School
Conv/YJ	.311		
Primary School	.822	.204	
Anytime	.963	.324	.638

All of these correlations were statistically significant ($p < 0.001$). Both the Primary School and Anytime variables are clearly making a contribution to the total CYRAS-YRS score. The Anytime variable very strongly ($r = 0.963$) correlates with total CYRAS-YRS score.

3.4.1 *Main finding of research*

The correlation between reoffending (as measured by Conv/YJ) and total CYRAS-YRS score was 0.311 for the 425 cases in the sample. This was highly significant, $p < 0.001$, and strong validation of the CYRAS-YRS as a risk scale for future offending. This is the main finding of this research.

Three ANOVAs were performed, comparing the cases that scored 1 for reoffending with those that scored zero:

Table 3.8: Results of ANOVAs for Conv/YJ by TOTAL, Primary School and Anytime scores

		Sum of Squares	df	Mean Square	F	Sig.
TOTAL	Between Groups	4362.490	1	4362.490	45.257	.000
	Within Groups	40774.461	423	96.394		
	Total	45136.951	424			
Primary School	Between Groups	229.822	1	229.822	18.425	.000
	Within Groups	5276.295	423	12.474		
	Total	5506.118	424			
Anytime	Between Groups	2589.716	1	2589.716	49.463	.000
	Within Groups	22146.882	423	52.357		
	Total	24736.598	424			

These ANOVAs were highly significant, and further substantiate the positive finding indicated by the 0.311 correlation between reoffending and total CYRAS-YRS score. Also, the ANOVA found a highly significant result for the differences between the Primary School and Anytime scores of the two groups.

3.5 Further analyses (beyond main finding).

With the items now divided into two subscales (Primary School and Anytime), it would be interesting to explore whether there are any moderating effects whereby one subscale moderates the correlation between the other subscale and reoffending. It was expected that each subscale would at least partially moderate the relationship between the other subscale and reoffending.

Table 3.9: Zero-order correlations between Reoffending, Primary School and Anytime variables, with Anytime as the control variable

Control Variables			Primary School	Conv/YJ	Anytime
-none-[a]	Primary School	Correlation	1.000	.204	.638
		Significance (2-tailed)	.	.000	.000
		Df	0	423	423
	Conv/YJ	Correlation	.204	1.000	.324
		Significance (2-tailed)	.000	.	.000
		Df	423	0	423
	Anytime	Correlation	.638	.324	1.000
		Significance (2-tailed)	.000	.000	.
		Df	423	423	0
Anytime	Primary School	Correlation	1.000	-.003	
		Significance (2-tailed)	.	.951	
		Df	0	422	
	Conv/YJ	Correlation	-.003	1.000	
		Significance (2-tailed)	.951	.	
		Df	422	0	

When controlling for the effect of Anytime risk factors, the otherwise positive correlation between Primary School risk factors and reoffending reduces to -0.003, and therefore appears to be completely mediated. In other words, there is no evidence that childhood risk factors provide further evidence of current risk of reoffending, over and above the risk information already provided by Anytime risk factors. Anytime risk factors, which are often observed during adolescence, seem to be more predictive of reoffending during late adolescence than childhood risk factors are. However, the reverse was not found to be true when controlling for the effect of the Primary School variable, as shown in Table 3.10 below:

Table 3.10: Zero-order correlations between Reoffending, Primary School and Anytime variables, with Primary School as the control variable

Control Variables			Conv/YJ	Anytime	Primary School
-none-[a]	Conv/YJ	Correlation	1.000	.324	.204
		Significance (2-tailed)	.	.000	.000
		df	0	423	423
	Anytime	Correlation	.324	1.000	.638
		Significance (2-tailed)	.000	.	.000
		df	423	0	423
	Primary School	Correlation	.204	.638	1.000
		Significance (2-tailed)	.000	.000	.
		df	423	423	0
Primary School	Conv/YJ	Correlation	1.000	.256	
		Significance (2-tailed)	.	.000	
		df	0	422	
	Anytime	Correlation	.256	1.000	
		Significance (2-tailed)	.000	.	
		df	422	0	

When controlling for the effect of the Primary School variable, the Anytime variable had a correlation of 0.256 with reoffending, and remained statistically significant. In other words, the Anytime variable was not completely mediated by the Primary School variable, but this score was somewhat lower than the original correlation of 0.324 between Anytime and reoffending.

Here are some further descriptive statistics comparing cases with a Conv/YJ score of zero to those with a score of 1:

Table 3.11: Means and standard deviations of Total, Primary School, and Anytime variables by Conv/YJ score

	Total Mean (SD)	Primary School Mean (SD)	Anytime Mean (SD)
Conv/YJ score = 0	8.75 (7.80)	0.89 (2.43)	7.86 (6.14)
Conv/YJ score = 1	15.45 (10.76)	2.43 (4.00)	13.03 (7.77)

In each case, the pattern is clear. Cases where reoffending had been observed (as indicated by a Conv/YJ score of 1) had significantly higher scores on both the Anytime and Primary School variables, resulting in a significantly higher total CYRAS-YRS score as well. This is further evidence that the CYRAS-YRS appears to be a promising instrument for measuring risk of reoffending.

Having established that the CYRAS-YRS instrument as a whole has performed well, it is worth looking in further detail at the specific items in the instrument. Items (questions) preceded with an “f”, e.g. fQ1, refer to “flattened” (i.e. dichotomised) forms of the item concerned. Here are some basic descriptive statistics for each item (flattened to 1s and zeroes):

Table 3.12: Descriptive statistics of Conv/YJ, TOTAL, Primary School, Anytime and dichotomised CYRAS-YRS items

	Mean	Std. Deviation	N
Conv/YJ	.65	.478	425
TOTAL	13.08	10.318	425
Primary School	1.88	3.604	425
Anytime	11.20	7.638	425
fQ1a YJ contact	.32	.465	425
fQ1b FGC <14	.01	.108	425
fQ2 AWOL home	.29	.455	425
fQ3 steal home	.09	.286	425
fQ4 expel	.10	.305	425
fQ6a antisocial mates	.81	.395	425
fQ6b gang assn	.09	.282	425
fQ7 Truant school	.32	.469	425
fQ8 impulsivity	.06	.231	425
fQ9 hyperactivity	.09	.282	425
fQ10 Liar	.11	.317	425
fQ11 primary school beh	.25	.433	425
fQ12 defiant	.20	.402	425
fQ13 rule breaking	.11	.311	425
fQ14 police apprehension	.10	.305	425
fQ15 drug abuse	.37	.484	425
fQ16 theft shops	.35	.478	425
fQ17a frequency past offending	.27	.442	425
fQ17b severity past offending	.93	.260	425
fQ18 alcohol/drug use	.45	.498	425

Here are the correlations between each (dichotomised) CYRAS-YRS item and the reoffending measure Conv/YJ:

Table 3.13: Correlations between individual CYRAS-YRS items and reoffending measure Conv/YJ

Item	Correlation with Conv/YJ	Significance (p-value)
Total CYRAS-YRS score	0.311	0.000
Primary School	0.204	0.000
Anytime	0.324	0.000
fQ7 Truant from school	0.281	0.000
fQ18 Alcohol/drug abuse	0.268	0.000
fQ6a Antisocial associates	0.238	0.000
fQ15 Drug abuse	0.232	0.000
fQ12 Defiant	0.213	0.000
fQ17a Frequency of past offending	0.210	0.000
fQ11 Primary school behaviour	0.198	0.000
fQ17b Severity of past offending	0.190	0.000
fQ2 AWOL from home	0.182	0.000
fQ1a YJ contact	0.173	0.000
fQ16 Theft from shops	0.171	0.000
fQ3 Stealing from home	0.162	0.001
fQ4 Expel school	0.154	0.001
fQ9 Hyperactivity	0.141	0.004
fQ8 Impulsivity	0.138	0.004
fQ13 Rule-breaking	0.131	0.007
fQ10 Liar (primary school age)	0.124	0.011
fQ14 Police apprehension	0.089	0.066
fQ1b FGC <14	0.035	0.473
fQ6b Gang association	0.018	0.704

Overall, there is a spread of positive correlations, with most of the items appearing to make some positive contribution to predicting risk. None of the items correlated negatively with the reoffending measure.

Only two of the items (not including fQ5, adult court, which was removed from analysis since no cases scored above zero) had correlations that were so low that they appear non-contributory. These items were fQ6b (gang association, 0.018, $p = 0.704$) and fQ1b (FGC <14, 0.035, $p = 0.473$). For the variable fQ1b (FGC <14), it is noteworthy that only five cases out of

425 had a nonzero score, and thus a correlation score is less meaningful due to range restriction effects.

The third lowest item, fQ14 Police apprehension, came out with a correlation of 0.089 and a p-value of 0.066. In other words, it was not quite significant at the 5% level. The fourth lowest item, fQ10 Liar (primary school age) produced a correlation of 0.124 and a p-value of 0.011. All of the other 16 items were significant at the 1% level. The three main variables (Total CYRAS-YRS score, Primary School and Anytime) were all highly significant, with p-values less than 0.001. In other words, the instrument as a whole appears to be good at predicting reoffending, as do most of its component items when taken by themselves.

3.5.1 *Males and females*

It is worth comparing the descriptive statistics for males and females in order to assess similarities and differences between the two sexes. Males: 164/235 or 69.8% were observed to reoffend; Females: 111/190 or 58.4% were observed to reoffend.

Table 3.14: Total, Primary School and Anytime scores by sex and Conv/YJ

	Male Conv/YJ=0 n=71 Mean (SD)	Male Conv/YJ=1 n=164 Mean (SD)	Female Conv/YJ=0 n=79 Mean (SD)	Female Conv/YJ=1 n=111 Mean (SD)	Overall Conv/YJ=0 N=150 Mean (SD)	Overall Conv/YJ=1 N=275 Mean (SD)
Total	7.55(7.49)	14.85(11.37)	9.82(8.00)	16.33(9.78)	8.75(7.80)	15.45(10.76)
Primary School	0.82(2.56)	2.75(4.42)	0.95(2.32)	1.95(3.26)	0.89(2.43)	2.43(4.01)
Anytime	6.73(5.20)	12.10(7.80)	8.87(6.75)	14.39(7.46)	7.86(6.14)	13.03(7.77)

More males than females were found to reoffend, as measured by Conv/YJ (164/235 or 69.8% for males, compared to 111/190 or 58.4% for females). At the same time, the 71 non-reoffending males scored lower (7.55) than the 79 non-reoffending females did (9.82) on the CYRAS-YRS. Male cases where reoffending was detected also had a lower mean (14.85) than such female cases (16.33). In other words, the CYRAS-YRS instrument identified more risk

factors for both reoffending and non-reoffending female cases in the sample than it did for their respective male counterparts, yet the female cases appeared to reoffend less often than male cases with the same (or even somewhat lower) CYRAS-YRS scores.

The female cases in each group (i.e. recidivists and non-recidivists) scored higher on the Anytime variable, and lower on the Primary School variable. The difference in Primary School scores was proportionally larger (2.75 vs. 1.95) for the male vs. female 1 cases than it was for the male (0.82) vs. female (0.95) zero cases. However, this finding does not need to be considered by itself; below, the relationships between the Primary School, Anytime and Total scores are examined for each sex. Also, correlations with the reoffending measure (Conv/YJ) will be calculated for each individual CYRAS-YRS item, for each sex.

Having compared the male and female cases, it is important to assess whether the above general findings regarding the instrument's validity can also be substantiated for cases of each sex. The same procedures (e.g. inter-correlations, ANOVAs, partial correlations) were repeated for each sex separately in order to examine the generalisability of the general findings.
Here are the data for the whole sample, males and females, beginning with basic descriptive statistics:

Table 3.15: Descriptive statistics comparing males, females and the whole sample on Conv/YJ, Total, Primary School and Anytime scores

CYRAS-YRS items	All Mean (SD)	Female Mean (SD)	Male Mean (SD)
Conv/YJ	0.65 (0.48)	0.58 (0.49)	0.70 (0.46)
TOTAL	13.08 (10.32)	13.63 (9.60)	12.65 (10.87)
Primary School	1.88 (3.60)	1.53 (2.94)	2.17 (4.04)
Anytime	11.20 (7.64)	12.09 (7.65)	10.48 (7.57)
n=	425	190	235

ANOVAs were performed for males and females separately, to examine whether cases that scored positively on the reoffending variable (Conv/YJ) had higher scores on Total CYRAS-

YRS score, and on the Primary School and Anytime variables. It was found that, for both males and females, cases with Conv/YJ scores of 1 had significantly higher scores on all three of these variables than cases with Conv/YJ scores of 0 did. For Total CYRAS-YRS score, the F value was 23.80 ($p < 0.001$) for females and 24.66 ($p < 0.001$) for males. For the Primary School variable, the F value was 5.42 ($p = 0.021$) for females and 11.85 ($p = 0.001$) for males. For the Anytime variable, the F value was 27.29 ($p < 0.001$) for females, and 27.84 ($p < 0.001$) for males.

For both sexes, as well as for the overall sample (see above), the group with Conv/YJ scores of 1 had significantly higher scores than the group with Conv/YJ scores of 0 on Total CYRAS-YRS score, Primary School and Anytime alike. In other words, reoffenders have more risk factors across the board, regardless of sex.

A mediation analysis was also performed using partial correlations, for each sex, in order to determine whether males and females differed and whether the findings from the overall sample mediation analysis can be generalised across sexes. Once again, the results for each sex were similar, and were of the same nature as the results for the overall sample. For females, a correlation of 0.167 ($p = 0.021$) between Conv/YJ and Primary School was reduced to -0.038 ($p = 0.606$) when Anytime was included as an intermediary variable, and a correlation of 0.356 ($p < 0.001$) between Conv/YJ and Anytime was reduced slightly to 0.321 ($p < 0.001$) with Primary School as an intermediary variable. For males, a correlation of 0.220 ($p = 0.001$) between Conv/YJ and Primary School was reduced to -0.027 ($p = 0.683$) with Anytime as an intermediary variable, and a correlation of 0.327 ($p < 0.001$) between Conv/YJ and Anytime was reduced to 0.249 ($p < 0.001$) with Primary School as an intermediary variable.

In other words, for both sexes, Anytime completed mediated the predictive utility of Primary School, whereas Primary School moderated the predictive utility of Anytime only partially. The strong, and apparently complete, mediation effect of the Anytime variable is highly noteworthy. It is also worth noting that the findings for each sex are of the same nature as the findings for the overall sample. This suggests that the finding is quite robust.

For all the above analyses for the male and female samples, the finding is of the same nature as the finding from the overall sample. In other words, the instrument's main outcomes apply equally regardless of the sex of the young offender. There are some slight variations in the strength of the above findings, but in each case the main finding is the same for each sex as it is for the overall sample.

Next, we compare females and males in terms of their score on individual CYRAS-YRS items. Here are the correlations with Conv/YJ of each individual CYRAS-YRS item, with figures for each sex plus the overall figure (the figures in brackets indicate the p-values for the correlations that precede them):

Table 3.16: Correlations of items with Conv/YJ by sex

Item	Overall sample	Females	Males
Total CYRAS-YRS score	0.311 (0.000)	0.335 (0.000)	0.309 (0.000)
Primary School	0.204 (0.000)	0.167 (0.021)	0.220 (0.001)
Anytime	0.324 (0.000)	0.356 (0.000)	0.327 (0.000)
fQ7 Truant from school	0.281 (0.000)	0.378 (0.000)	0.236 (0.000)
fQ18 Alcohol/drug abuse	0.268 (0.000)	0.278 (0.000)	0.272 (0.000)
fQ6a Antisocial associates	0.238 (0.000)	0.292 (0.000)	0.216 (0.001)
fQ15 Drug abuse	0.232 (0.000)	0.222 (0.002)	0.254 (0.000)
fQ12 Defiant	0.213 (0.000)	0.174 (0.017)	0.255 (0.000)
fQ17a Frequency of past offending	0.210 (0.000)	0.220 (0.002)	0.227 (0.000)
fQ11 Primary school behaviour	0.198 (0.000)	0.183 (0.012)	0.200 (0.002)
fQ17b Severity of past offending	0.190 (0.000)	0.220 (0.002)	0.179 (0.006)
fQ2 AWOL from home	0.182 (0.000)	0.188 (0.009)	0.222 (0.001)
fQ1a YJ contact	0.173 (0.000)	0.151 (0.038)	0.192 (0.003)
fQ16 Theft from shops	0.171 (0.000)	0.196 (0.007)	0.190 (0.004)
fQ3 Stealing from home	0.162 (0.001)	0.150 (0.039)	0.190 (0.004)
fQ4 Expel school	0.154 (0.001)	0.161 (0.026)	0.154 (0.018)
fQ9 Hyperactivity	0.141 (0.004)	0.049 (0.499)	0.159 (0.015)
fQ8 Impulsivity	0.138 (0.004)	0.087 (0.233)	0.148 (0.023)
fQ13 Rule-breaking	0.131 (0.007)	0.149 (0.040)	0.123 (0.059)
fQ10 Liar (primary school age)	0.124 (0.011)	0.018 (0.809)	0.196 (0.003)
fQ14 Police apprehension	0.089 (0.066)	0.049 (0.502)	0.106 (0.105)
fQ1b FGC <14	0.035 (0.473)	-0.018 (0.809)	0.075 (0.253)
fQ6b Gang association	0.018 (0.704)	-0.033 (0.653)	0.119 (0.069)

Overall, the differences between females and males are not huge. For 13 out of the 20 items, there is a clear correlation with a p-value of less than 0.05 in all three columns. For 10 out of 20 items, all three columns contain a p-value of less than 0.01, whereas the female sample has a p-value between 0.01 and 0.05 for the other three of those 13 items. In other words, most of the items are predicting reoffending, regardless of sex/gender.

Females score higher than males for both antisocial associates and truancy (although for both sexes, these items decisively predict reoffending). Impulsivity and hyperactivity were found to predict reoffending for males, but not for females. Telling lies at primary school age was also found to be a risk factor only for males, but not for females. Low incidence rates of endorsing these items may account for the absence of a significant correlation for females. For both sexes, police apprehension, FGC <14 and gang association did not predict reoffending.

3.6 Serious offending.

Some data are also available on the extent to which (Total) CYRAS-YRS scores predicted subsequent *serious* offending during the follow-up period. Severity of offending was measured based on the mean length of sentence typically received in New Zealand criminal courts for the type of offence that a study participant was convicted for. For this analysis, a conviction was considered "serious" if it had a mean sentence length greater than 100 days of imprisonment. For each participant, the seriousness level of their most serious conviction (maximum seriousness) was determined, and the number of serious convictions was counted.

The correlation between a participant's CYRAS-YRS score and the sentence length of their most serious offence was found to be 0.155, whereas CYRAS-YRS score had a correlation of 0.292 with the number of serious convictions. Considering all convictions (whether "serious" or otherwise), CYRAS-YRS score had a correlation of 0.388 with the number of convictions received by participants during the follow-up period. In other words, *frequency* of reoffending correlated more strongly with CYRAS-YRS score than *severity* of reoffending did.

When considering only the presence or absence of serious convictions, i.e. dichotomising this variable to zeroes and 1s, the correlation with CYRAS-YRS score increased somewhat to 0.370. This is somewhat higher than the correlation of 0.311 between CYRAS-YRS score and YJ/Conv, reported earlier. The dichotomised serious conviction variable correlated 0.366 ($p < 0.001$) with the Anytime variable, and 0.284 ($p < 0.001$) with the Primary School variable. As noted previously, the corresponding correlations for the YJ/Conv variable were 0.324 with Anytime and 0.284 with Primary School. In other words, both subscales as well as the total CYRAS-YRS score are slightly more highly correlated with serious offending than they are with a variable measuring any observed criminally significant offending. All of these correlations were statistically significant ($p < 0.001$).

The variable Conv-serious, a dichotomised variable which measured whether participants had committed any serious reoffending during the follow-up period, was found to have a mean of 0.21 and a s.d. of 0.41. In other words, only 21% of participants committed a serious offence during the follow-up period, as opposed to 65% who committed any offence. This difference is unsurprising given the generally lower prevalence of serious offending. Neither 0.21 nor 0.65 are extreme enough figures to raise concerns about floor or ceiling effects, which is good. The fact that these two figures are comfortably on either side of 0.50 suggests that the follow-up data are useful and appropriate balanced with respect to these variables.

Many of the above analyses were repeated, in order to explore whether Conv-serious followed a similar pattern as Conv/YJ. Partial correlations were calculated between Anytime, Primary School, and Conv-serious for the whole sample. Next, males and females were compared using similar analyses as above.

The correlation between Conv-serious and Primary School was 0.284 ($p < 0.001$). After controlling for Anytime as an intermediary variable, this correlation was reduced to 0.071 ($p = 0.146$). The correlation between Conv-serious and Anytime was 0.366 ($p < 0.001$). After controlling for Primary School, it was reduced to 0.250 ($p < 0.001$). In other words, Anytime seemed to completely or almost completely mediate the relationship between Conv-serious and Primary School, whereas Primary School partially moderated the relationship between Conv-serious and Anytime. This is consistent with the above finding for the relationship between Conv-YJ and these two CYRAS-YRS subscales.

Further analyses with serious offending were calculated for males and females separately. For females, the mean Conv-serious score was 0.17 (s.d. 0.38), whereas for males the mean was 0.24 (s.d. 0.43). This suggests that somewhat more males than females reoffended during the

follow-up period, but 0.17 is still a sufficiently high proportion to allay concerns about floor effects. To be more precise, 33 cases out of 190 females scored a 1 for Conv-serious.

For females, the correlation between Conv-serious and Primary School was 0.248 ($p = 0.001$). With Anytime as an intermediary variable, this correlation was reduced to 0.078 ($p = 0.285$). The correlation between Conv-serious and Anytime was 0.338 ($p < 0.001$) for females. It was reduced somewhat to 0.249 ($p = 0.001$) when Primary School was used as an intermediary variable.

For males, the correlation between Conv-serious and Primary School was 0.297 ($p < 0.001$). Using Anytime as an intermediary variable reduced this correlation to 0.000 ($p = 0.995$). The correlation between Conv-serious and Anytime was 0.408. This correlation was reduced somewhat to 0.294 ($p < 0.001$) with Primary School as an intermediary variable.

For both males and females when considered separately, a similar pattern emerges: the correlations between Conv-Serious and the other variables are mediated completely by Anytime, but moderated only partially for Primary School, when each is examined as an intermediary variable. These results are notably consistent across both sexes, and for both serious offending and overall offending. In other words, the mediation effect of the Anytime variable appears to be very robust and consistent across different conditions.

It may be useful to explore serious offending in more detail by examining its relationship to each individual CYRAS-YRS item. Here are the correlations between each CYRAS-YRS item and a variable measuring the presence or absence of *serious* reoffending:

Table 3.17: Correlations between items and Conv-Serious by sex

Item	Overall sample	Females	Males
Conv/YJ	0.383 (0.000)	0.387 (0.000)	0.372 (0.000)
Total CYRAS-YRS score	0.370 (0.000)	0.346 (0.000)	0.395 (0.000)
Primary School	0.284 (0.000)	0.248 (0.000)	0.297 (0.000)
Anytime	0.366 (0.000)	0.338 (0.000)	0.408 (0.000)
fQ7 Truant from school	0.256 (0.000)	0.295 (0.000)	0.261 (0.000)
fQ18 Alcohol/drug abuse	0.310 (0.000)	0.266 (0.000)	0.351 (0.000)
fQ6a Antisocial associates	0.224 (0.000)	0.165 (0.023)	0.274 (0.000)
fQ15 Drug abuse	0.304 (0.000)	0.255 (0.000)	0.350 (0.000)
fQ12 Defiant	0.241 (0.000)	0.240 (0.001)	0.246 (0.000)
fQ17a Frequency of past offending	0.262 (0.000)	0.263 (0.000)	0.281 (0.000)
fQ11 Primary School behaviour	0.220 (0.000)	0.165 (0.023)	0.249 (0.000)
fQ17b Severity of past offending	0.123 (0.011)	0.119 (0.102)	0.131 (0.044)
fQ2 AWOL from home	0.237 (0.000)	0.191 (0.008)	0.312 (0.000)
fQ1a YJ contact	0.181 (0.000)	0.173 (0.017)	0.188 (0.004)
fQ16 Theft from shops	0.150 (0.002)	0.133 (0.066)	0.192 (0.003)
fQ3 Stealing from home	0.140 (0.004)	0.024 (0.744)	0.248 (0.000)
fQ4 Expel school	0.164 (0.001)	0.149 (0.041)	0.181 (0.005)
fQ9 Hyperactivity	0.269 (0.000)	0.030 (0.686)	0.343 (0.000)
fQ8 Impulsivity	0.247 (0.000)	0.089 (0.223)	0.295 (0.000)
fQ13 Rule-breaking	0.209 (0.000)	0.256 (0.000)	0.181 (0.005)
fQ10 Liar (primary school age)	0.143 (0.003)	0.041 (0.570)	0.200 (0.002)
fQ14 Police apprehension	0.164 (0.001)	0.020 (0.781)	0.240 (0.000)
fQ1b FGC <14	0.104 (0.033)	0.089 (0.223)	0.113 (0.085)
fQ6b Gang association	0.065 (0.183)	0.035 (0.634)	0.124 (0.058)

Figures in brackets refer to the p-values of the correlations. The items are presented in order of correlation with Conv/YJ, thus illustrating the similar order of descending correlations. As with Conv/YJ, only a small minority of items failed to correlate with (in this case, serious) reoffending. Only two items failed to correlate with serious reoffending with a p-value of 0.01 or lower, and these same two items had the least correlation with Conv/YJ. In other words, the vast majority of items correlated positively with serious reoffending, and this pattern was even more apparent with serious reoffending than it was with Conv/YJ.

When considering the statistics for males and females separately, as many as nine of the 20 correlations were not significant at the 95% level for females. These nine items were largely concentrated at the bottom of the list; in other words, the most predictive items on the list were

predictive for both males and females. For males, all but one item (fQ1b FGC <14) yielded correlations with Conv-Serious that were significant at the 95% level. Overall, Total CYRAS-YRS score predicted serious reoffending for females (0.346) slightly less strongly than for males (0.395). As noted above, for the overall reoffending measure Conv/YJ, the correlations with Total CYRAS-YRS score were 0.335 for females and 0.309 for males.

3.7 Refining the scale by removing the least contributory items.

Based on the order of items in Table 3.17 above, the least contributory items were subtracted from Total CYRAS-YRS score, and correlations with both Conv/YJ and Conv-Serious were calculated. The two least contributory items for Conv-Serious were also the two least contributory items for Conv/YJ: FGC < 14, and Gang association. When removing only Gang association, the least contributory item, the correlations with Conv/YJ and Conv-Serious respectively shifted slightly from 0.311 and 0.383 to 0.316 and 0.374. With the two least contributory items removed, these figures were 0.317 and 0.374.

The following table illustrates the trajectory of the correlations as increasing numbers of the least contributory items are removed. Please note that the items selected to be removed were based on the order of least to most contributory items for predicting Conv/YJ, and not for predicting Conv-Serious.

Table 3.18: Correlations with Conv/YJ and Conv-Serious as items are removed from the scale, beginning with the least contributory items.

Number of items removed	Correlation with Conv/YJ	Corr with Conv-Serious
0	0.311	0.383
1	0.316	0.374
2	0.317	0.374
3	0.321	0.372
4	0.326	0.376
5	0.334	0.378
6	0.333	0.373
7	0.333	0.369

8	0.336	0.372
9	0.336	0.373
10	0.336	0.377
11	0.336	0.373
12	0.347	0.379
13	0.341	0.375
14	0.348	0.374
15	0.346	0.363
16	0.342	0.356
17	0.350	0.351
18	0.325	0.331
19	0.276	0.243

In every single case, these correlations were significant to $p < 0.001$. Consequently, the above results are presented without p-values. The inclusion of exact p-values would help to establish a trajectory to determine whether the correlations became more or less statistically significant with each step. Since the present study was conducted without software that measures p-values beyond three decimal places, the above results are incomplete. However, several observations are worth noting from these data. For correlations with Conv-Serious, at no stage does removing items increase the scale's performance above the baseline of 0.383 with all 20 items included, although major deterioration does not occur until about 15 items have been removed.

For correlations with Conv/YJ, these figures gradually increase from 0.311 up to 0.350 with 17 items removed and only the best three items remaining. There are two comparative spurts (from 0-5 items removed and from 11-17 items removed), whereas the trajectory is basically flat from 0.334 with 5 items removed through to 0.336 with 11 items removed. With only two items included, the correlations with Conv/YJ and Conv-Serious respectively both slip dramatically from 0.350 and 0.351 (best three items) to 0.325 and 0.331 (best two items). With only the best item (Truancy) included, these correlations slip further to 0.276 and 0.243. Please note that these figures are based upon raw scores for Truancy, as opposed to the dichotomised scores used for the major analyses further above.

It is, of course, unsurprising that these correlations decrease rapidly when fewer than three items are included in the scale. The noteworthy result, rather, is the fact that the scale performs passably with as few as its three best items. The comparatively slight improvement in correlations with Conv/YJ from 0.311 to 0.350 needs to be regarded tentatively due to the lack of accompanying statistics on p-value changes, plus the degree of improvement in the correlation figure itself is not huge. Nothing in the above results should be taken as strong evidence to remove any items from the scale, at this stage of the development of the CYRAS-YRS instrument.

To summarise the main results, Total CYRAS-YRS score successfully predicted both general reoffending and serious reoffending, as did most of the individual items on the instrument. These findings were largely consistent across sex, and Total CYRAS-YRS score predicted both general and serious reoffending about equally well for both sexes. Another very consistent finding was that, across both sexes, the relationship of offending to risk factors that specifically related to early childhood (Primary School variables) was completely mediated by those risk factors that may appear at any time during youth (Anytime risk factors). This was true for both serious and general reoffending. These results have considerable theoretical and practical significance, as will be discussed next.

4. Discussion

The purpose of the present research was to examine the reliability and validity of the Youth Risk Screen (YRS), using computerised records to acquire the data. The original YRS was modified slightly in order to adapt some of the questions to computerised data collection, but such changes were fairly minimal and the instrument retained most of its original form. The CYRAS-YRS data for each case were collected for that case's first YJ intake (i.e. the first recorded offence) in 2002, whereas the follow-up period comprised reoffending during 2003-5. Consequently, the current findings pertain to reoffending during the 3-4 years following data being collected. For most of the 425 cases in this study, they will have been aged around 14-22 during the follow-up period. Due to the age-crime curve, it is likely that reoffending for this group could decrease later in life for many of these cases.

4.1 Reliability.

The CYRAS-YRS was found to have good internal consistency, with a Cronbach's alpha figure of 0.872. A number of factors have helped the instrument's reliability: 20-21 is a reasonable number of questions, and the results were not hampered by any notable ceiling or floor effect. In terms of the present research, the high sample size of 425 helped contribute to reliable findings.

4.2 CYRAS-YRS versus Interview-YRS.

It is noteworthy that the CYRAS-YRS performed better than the Interview-YRS with respect to both reliability and validity. Whilst the sample size was large for the CYRAS-YRS (425 cases), it was still reasonable for the Interview-YRS (143 cases). However, the Interview-YRS cases were taken from high-risk samples, whereas the CYRAS-YRS cases were sampled randomly from the national database. This resulted in a broader spread and higher mean for the CYRAS-YRS cases (range 2-59, mean 13.1, s.d. 10.3) compared to the Interview-YRS cases (range 17-67, mean 44.9, s.d. 10.9). As a proportion of the mean, the standard deviation for the CYRAS-YRS cases was

higher than that for the Interview-YRS cases. The range for the Interview-YRS cases was thus somewhat truncated, with low-risk cases not being included. Further research would be useful in order to see whether the Interview-YRS performs better with these discrepancies addressed than it did in the present study.

Nonetheless, the significantly better performance of the CYRAS-YRS compared to the Interview-YRS, with respect to both reliability and validity, raises the possibility that computerised data records may be a more promising avenue for researching data for the YRS, and perhaps even for other instruments, and for risk assessment purposes more generally. As discussed in the Introduction, it is a well-established finding that actuarial measures are vastly superior to clinical judgement in predicting reoffending. The face-to-face interviewing for the YRS relies upon asking information that may be recalled incorrectly by either the young offender or/and the parent or guardian. Factors which have been identified as potentially compromising the reliability and validity of interview data include the personal motivations of respondents (Voss, Rothermund & Brandstadter, 2008), and the highly emotionally-charged nature of the situation (Brainerd, Stein, Silveira, Rohenkohl, & Reyna, 2008). Burt, Kemp & Conway (2008) found that the reconstructive mechanisms of memory can contribute to biases in information being recalled.

Furthermore, intentionally dishonest answers by the young person or/and their parent or guardian may also have a detrimental effect on the ability of interviewers to collect authentic data. Attempts are made to mitigate this effect; the YRS manual advises that interviewers remind participants that their responses will not be used for law enforcement purposes. In addition, the Interview-YRS has a scale (Scale 1) measuring consistency between the young person's and parent or guardian's responses, which may help mitigate this somewhat. The YRS manual advises that information from other sources (e.g. official records) is sought to corroborate information from respondents, particularly if Scale 1 discrepancies arise. Nonetheless, some respondents may be

distrustful of groups such as professionals, social workers, government employees and law-abiding citizens generally, and may be in the habit of lying readily for personal convenience. Furthermore, respondents who are higher risk may be more likely to intentionally give false or misleading information that makes them appear to be lower risk, thus confounding the data. By comparison, computerised data records kept by social work agencies such as CYF may be more accurate, for several reasons. Social workers do not usually misrepresent people's information on purpose, and they have strong disincentives to do so. In most cases, social workers are relatively impartial, neutral observers who do not stand to gain anything in particular from misrepresenting someone's risk factors. Also, social workers typically record information to CYRAS soon after they become aware of it, thus reducing the risk of information being recorded inaccurately due to it not being remembered correctly.

4.3 Validity.

One of the major aims of this study was to test the predictive validity of the CYRAS-YRS, which had not yet been validated at the time of this study. Risk prediction with young offenders is important in order to identify offenders to target for treatment, and instruments provide a promising avenue given the better performance of actuarial, structured data collection compared to subjective clinical impressions. Many of the individual CYRAS-YRS items were found to correlate positively with reoffending at a level that was statistically significant. This was true of most items for females, and nearly all items for males and for the overall sample. This was the case for both general reoffending and serious reoffending; in fact, the items performed even better for serious reoffending than they did for general offending. The correlation between serious reoffending and Total CYRAS-YRS score was 0.383, which is higher than the already highly significant correlation of 0.311 between general reoffending and Total CYRAS-YRS score.

As noted previously in the Results section, two factors were derived for the CYRAS-YRS, based in significant part on the results of the Factor Analysis. One of these factors (Primary School) comprised variables that refer specifically to early childhood, whereas the other factor (Anytime) contained variables that could apply at any stage during youth. Both the Primary school and Anytime variables were found to predict reoffending, demonstrating correlations of 0.204 and 0.324 respectively with the reoffending measure. However, when controlling for the mediating influence of the Anytime variable, it was found that the Primary school variable no longer predicted reoffending. This finding is noteworthy because it suggests that young offenders who present with risk factors from early childhood could have their risk level lowered (perhaps considerably) if their risk factors are reduced or eliminated by the time they reach adolescence.

The three items that were least predictive of reoffending were Police apprehension, FGC <14, and Gang association. Police apprehension and FGC <14 refer to responses to antisocial behaviour by branches of the government, rather than to the antisocial behaviour itself. Consequently, it may be that measuring the young offender's own behaviour directly provides a better risk measure, due to being more proximate. In the case of the low predictive power of Gang association, it may be low due to incomplete information on the CYRAS database. Overall, individual items may be confounded in some cases, but the general finding overwhelmingly endorses the CYRAS-YRS and its potential to predict reoffending.

Antisocial associates is a good example of an item on the CYRAS-YRS which may benefit from further refinement. Although it performed quite well in predicting reoffending, the way this item was measured was not ideal. It was measured based on a dichomotised yes/no as to whether or not a case was recorded as having antisocial associates, which could be either peers or/and family. Furthermore, cases where co-offenders were noted scored positively on this item. It would be preferable to have a more in-depth measurement of an offender's antisocial associates, which would

be possible if a convention was established to record information in social work databases based on its potential for use for research (and treatment) purposes.

These findings provide yet another reason to strive to predict risk, and offer treatment and intervention, from as young an age as possible. The finding that the CYRAS-YRS items predict serious reoffending even more strongly than general reoffending is yet another reason to consider that treatments of high-risk offenders may have merit. Other reasons for early intervention include the fact that most repeat, serious offenders begin their offending at an early age, combined with the fact that a significant amount of crime is concentrated amongst this core group of offenders. One possible explanation for the somewhat greater contribution of Anytime risk factors compared to historical childhood ones is that, in general, recent past behaviour tends to predict future behaviour even more strongly than distant past behaviour does.

4.4 Sex differences.

Females are under-represented in much of the literature on young offending (and indeed, on criminal offending more generally). Many studies either consider only male offenders, or else contain a problematically-small subsample of female offenders, thus making it difficult to investigate whether the findings can be generalised to apply to both male and female offenders. Sometimes conclusions are drawn about young offenders generally based on a sample that comprises mostly male offenders, reflecting the fact that female offenders are more rare in the general population.

The present study's usage of computerised data records from a national sample was very successful in overcoming the usual sample size difficulties that constrain research on female offenders. Consequently, computerised data records are likely to be a promising avenue for further research on female offenders. Sex differences are an important area to investigate, in order to

explore possible factors which may explain why most offenders are male. Consequently, the present study fills a gap in the research literature on female offenders, and on sex differences in young offenders, by using a decent sample size of female offenders that is rarely seen elsewhere in the literature. It was possible to oversample female cases because the sample used in the present research was taken from a much larger national sample of young offenders. By and large, the main findings of this study applied to both males and females. The main difference was that a somewhat larger minority of items failed to predict offending at the 5% level of statistical significance for female cases, compared to male cases where almost all items predicted reoffending. However, this difference is comparatively minor since a majority of items predicted reoffending for both sexes.

Whilst there was a somewhat larger sample size for males (235 cases), the sample size for females was also comprehensive (190 cases), and thus any sex differences are probably not merely artefacts of sample size differences. It is not clear why these differences in the performance of individual items were found. However, it is worth noting that females in this sample are more acutely atypical (i.e. further to the antisocial end of the bell curve) than males are, compared to the general population, due to the lower overall prevalence of female offending. Consequently, if adolescent females require more risk factors in order to "tip them over" into becoming offenders, this may explain why any one risk factor alone may be less likely to be sufficient to lead to offending by itself. A population study may well show that females in the general population have fewer risk factors than males.

It was found that females scored higher than males for both Antisocial associates and Truancy. This is noteworthy because Truancy may be serving as a proxy variable for another risk factor, perhaps related to having antisocial associates. In other words, Truancy may be a risk factor at least in part because it predicts one or more secondary behaviours, such as meeting up with

antisocial associates during school hours. By contrast, Antisocial associates predicted *Serious* reoffending more strongly for males (0.274) than it did for females (0.165).

It is noteworthy that more males (164/235 or 69.8%) than females (111/190 or 58.4%) were observed to reoffend (by way of at least one further YJ intake or/and criminal conviction), whereas the female cases had a higher mean total CYRAS-YRS score (13.63) than the male cases did (12.65). In other words, the females in the sample presented with more risk factors, but yet they appeared to reoffend less. This finding is consistent with the established trend that there are fewer female than male offenders. If being female is a comparative protective factor whereas being male is a comparative risk factor for criminal activity and recidivism, for whatever reason(s), then it is not surprising that male offenders need fewer other risk factors to put them at risk for reoffending.

However, the main findings of the study were confirmed to hold for both female and male cases when the cases for each sex were considered separately. The correlations between the Total CYRAS-YRS score and the Reoffending measure were 0.335 and 0.309 for females and males respectively. Both of these figures were significant with a p-value of less than 0.001. The fact that these findings were also observed consistently across males and females further supports the main findings, and underscores the fact that many of these risk factors are consistent across sexes. It is promising that even 190 cases of females were sufficient to produce these positive results, whilst the total sample size comprised 425 cases.

4.5 Theoretical implications.

Interestingly, the results of this study support the YRS itself more strongly than aspects of the theoretical basis for its development. Specifically, Lynam and Moffitt have postulated a theory (articulated in Lynam, 1996) that comorbid ADHD and CD is often a feature of LCP offenders. The Primary School items (notably including impulsivity, hyperactivity, and the ODD/CD items) predict

reoffending, and they do predict serious offending somewhat more strongly than general offending. However, they do not stand out overwhelmingly. Also, the fact that the Primary School risk factors appear to be completely mediated by other variables does not fit neatly with Moffitt's paradigm of LCP offenders, although it is not entirely inconsistent given that Moffitt (1993) postulated that the LCP path is characterised by few opportunities to desist from a chronic offending trajectory. However, the current results need further investigation; such questions could be addressed more comprehensively if the CYRAS records were kept more systematically to measure the presence or absence of risk factors. The evidence for Moffitt and Lynam's theoretical models is mixed from the present findings, whereas the CYRAS-YRS instrument itself is very strongly supported by the present study.

Some speculative interpretation of possible explanations for these results may help guide future research priorities. It may be that persons who have the risk factors to be potential chronic offenders are indeed lacking in empathy and insensitive to prosocial behavioural norms, or/and insensitive to punishment, but yet they may be sensitive to positive reinforcement for antisocial behaviour such as that provided by antisocial associates. It may be that pervasive deficits in empathy are more intractable for some offenders than others; this is a matter that has not yet been resolved in the research literature. For some offenders at risk of the LCP pattern, it may be that empathy-based treatments are effective whereas an insensitivity to punishment may be more intractable for them. All of these hypotheses naturally require treatment outcome research to investigate. However, the very fact that a lower rate of Anytime risk factors predicts lower reoffending is promising and suggests that it is highly worthwhile to look further at what treatments may be effective for high-risk offenders.

For both females and males, correlations with reoffending were statistically significant at the 5% level for both the Primary school and Anytime variables. Also, the Anytime variable was

observed to completely mediate the correlation between the Primary school variable and the reoffending measure. Interestingly, the correlation between the Primary school variable and reoffending was somewhat lower for females (0.167, p = 0.021) than for males (0.220, p = 0.001). Conversely, the correlation between the Anytime variable was somewhat higher for females (0.356) than it was for males (0.327). This difference is not large and its importance is unclear, but it may be that male offenders are more likely to be influenced by chronic, internal, dispositional risk factors whereas female offenders may be particularly less prone to offend without situational risk factors such as belonging to a current antisocial peer group. This would be consistent with the above finding that antisocial associates (and truancy) predict reoffending somewhat more strongly for females than for males, whereas antisocial associates predicts *serious* offending more strongly for males than it does for females. These findings are consistent with Chung, Hill, Hawkins, Gilchrist and Nagin's (2002) finding that peer, school and neighbourhood factors played the greatest role in determining whether males who were already delinquent at age 13 would escalate or desist. In other words, repeat, serious offending may reflect an interaction of both dispositional and situational factors being present. This would be an interesting twist to Moffitt's original LCP vs. AL theory, which proposed the LCP group to be motivated largely by internal, dispositional factors and to lack sensitivity to situational factors such as social reinforcement and punishment. One possible shortcoming of the present analysis is that only a three-year follow-up period (2003-5) was examined, whereas long-term offending patterns may revert back towards Moffitt's theory. In other words, it is possible that offending in one's late teens and early 20s depends more on Anytime risk factors in the offender's present environment, whereas offending after age 25 may increasingly be affected by chronic individual risk factors such as those identified by the Primary School subscale. More longitudinal research could investigate whether, and to what extent, this is in fact the case.

Overall, the differences between males and females are relatively small. The same general findings largely apply to both males and females. Any interpretation of the few sex differences that

were found is very much tentative and preliminary, and further research is needed to explore sex differences in more detail. It needs to be stressed that the bulk of the findings applied for both males and females. Evaluating global theories on sex differences in antisocial behaviour is beyond the empirical scope of the present study, and thus the interpretative material below is intended to be speculative and guide future research possibilities. The more concrete findings in the present study pertain to the successful use of the CYRAS-YRS to predict reoffending, and the successful use of the national database to generate a sufficient sample size of female offenders.

It would be worth investigating the hypothesis that some aspects of the age-crime curve or/and Moffitt's LCP/AL theory pertain particularly to male offenders. It is noteworthy that many male offenders reduce or stop their offending (at least, as pertains to offending detected by the criminal justice system) as they age through their 20s, whilst opportunities to acquire money and status through conventional means become more available during this time. One possible factor which may explain the age-crime curve (at least in part) is that male offending may be related to reproductive success. More specifically, males whose ability to acquire money and status (with a view to attracting female partners) is limited may be more likely to pursue reproductive success through antisocial means such as crime. This hypothesis is consistent with the observed finding that crime rates are almost invariably higher in poor areas of town. It may be that, within the more criminally-minded subgroups or subcultures of society, crime is seen as somewhat more sexy or "cool" during adolescence, but becomes less so over time. Pursuing a criminal "career" and accumulating convictions tends to decrease one's opportunities for many forms of legitimate, conventional employment; thus, adolescent offending typically leads to possible short-term gains at the expense of long-term costs. The older offenders get, the more difficulty they have acquiring money and status, relative to non-offenders of their age group. This reduced ability to acquire conventional material success may be more consequential for males than for females, since money and status may be more relevant to reproductive success for males than for females.

This is a complicated hypothesis to investigate, because female offending may be higher during adolescence due (at least partly) to social pressures and norms, which could be the case even if those social norms exist primarily due to causes related to male reproductive success. However, the present study produced some interesting results, suggesting that adolescent female offending may be more related to situational risk factors. The present study's finding by itself is inconclusive, but it does suggest that this may be a worthwhile hypothesis to explore in more detail with further research in this area. Most of the previous research on the age-crime curve has used samples comprising mostly, or entirely, male participants. This is understandable, given constraints pertaining to gathering a sufficient sample size of female offenders. However, it would be useful for future research to further explore the age-crime curve, and theories related to it (such as Moffitt's theory), with respect to female offenders and sex differences. This would help understand whether the mechanisms that lead to the age-crime curve for male offenders are (to a greater or lesser degree) specific to males, or whether they pertain to risk factors that are not related to sex differences.

Moffitt (1993) suggested that a certain degree of antisocial or delinquent behaviour may be at least somewhat socially accepted for adolescent males, to a greater or lesser degree, and that it may be at least somewhat common for adolescent males to face peer pressure to commit antisocial behaviour, and social disincentives against complete abstinence from antisocial or delinquent behaviour. This hypothesis is consistent with the finding that fQ6a Antisocial associates correlated much more highly with serious reoffending for males (0.274) than females (0.165), whereas this variable correlated more strongly with general reoffending for females (0.292) than for males (0.216). In other words, adolescent males may be more likely to already face general social pressures to offend (depending on how antisocial their subcultural environment is) even in the absence of specific individual-level antisocial peers. However, the present study is of course merely one data point, and does not by any means comprehensively address this earlier hypothesis of Moffitt's.

There are a complex range of processes that may be involved in sex differences in antisocial behaviour, and it is not easy to study them empirically. Much of the aforementioned analysis is speculative (and thus often tentatively worded), and is intended to provide ideas that may be relevant for future research. It is worth noting that neither individual behaviour, nor cultural sex roles, are necessarily determined in a simple, linear manner by biological sex differences. Rather, the range of possible causal mechanisms behind any observed sex differences is much more complex. It could be, for example, that slight biological differences contribute (along with the actions of individuals and groups with power in society) to cultural sex roles over time, and that socialisation plays a stronger role in determining the behaviour of individuals than a weaker biological propensity does. In any case, even if there was some degree of biological propensity for aggression in males, this would be all the more reason to counteract it with prosocial cultural values. There is no reason at all to think that biological influences on behaviour are anywhere near intractable, and they should not be used as an excuse for aggressive behaviour nor as an excuse to oversimplify sex differences to a biological framework (and ignore possible sociocultural influences) based purely on observations that sex differences have been observed. On the contrary, the majority of persons of both sexes manage to live civilised lives without committing offences against the person or property of others, and the small minority for whom this is not the case need to be approached from a perspective of seeking to rehabilitate them.

4.6 Future research.

The method of computerised data collection in the present study provided highly useful for acquiring data to explore for potential sex differences (of which there were not many), and found that the study's main findings applied for both sexes. Having successfully researched cases by sex in this manner, it would be interesting to measure other demographic characteristics of cases in a sample of young offenders from CYRAS or other computerised data records. The CYRAS database

contains information on the ethnicity of cases, which is another demographic variable that would be worthwhile to investigate. Socio-economically disadvantaged ethnic groups are over-represented in the crime rate in New Zealand, and generally in other Western countries where social science research is conducted. It would be a fairly straightforward matter to conduct further research on CYRAS in order to explore whether the main findings of the present study (and indeed, validation studies on other instruments) apply regardless of ethnicity, as the present study's findings were substantiated regardless of sex. Another research question concerns whether differences in offending between ethnic groups are purely the result of socio-economic factors. This may be harder to research on CYRAS given that information on what area of town someone was born and raised in might be harder to acquire. However, one hypothesis that could be investigated is whether antisocial associates has a lower correlation with reoffending for demographic groups that are over-represented in the crime rate, for similar reasons that it had a lower correlation with (general) reoffending for males compared to females.

Given that 275 out of 425 (or 64.7%) of cases were observed to reoffend during this study's follow-up period, there is plenty of scope for longitudinal data collection as the rate of reoffending decreases. Longitudinal research to examine reoffending over time would thus be one promising avenue of future research. The reoffending measure in the present study comprised both future YJ intakes and future convictions. Since most (probably all) study participants would be 18 or older by 2006, longitudinal research could be conducted considering only convictions, rather than YJ intakes. Since the present study's findings were essentially positive in nature, it would be worth conducting follow-up research to gather further detail. The frequency, severity and type of reoffending are examples of further detail that could be gathered about these offenders. Future research could be conducted by taking a sample from the national database and scoring cases at multiple age points, with participants as close in age to each other as feasible.

One feature of research on young offenders in New Zealand is that the government processes cases differently at different ages. The age of full adult criminal responsibility is 18 in New Zealand, and this results in persons aged 18+ being given criminal entries on NIA (the Police database) and IOMS (Department of Corrections database), whereas offenders aged under 18 normally receive a YJ intake on CYRAS instead. Consequently, there is some awkwardness from the information being recorded on different databases and in different ways. Also, the age 14 has been a cutoff in terms of criminal responsibility, given that persons aged under 14 (as of the time of this study) could not be convicted for any offence except murder or manslaughter. These two fatal crimes are extremely rare, especially amongst young offenders (as indicated by the floor effect for Q5 adult court), and thus age 14 was a more pertinent cutoff mark for this study than age 10 (the age below which no person can be convicted of any crime under NZ law). Consequently, CYRAS processes cases differently based on whether they are aged 14+ or younger than 14, resulting in a higher threshold needing to be crossed before younger persons are given a YJ intake. Antisocial behaviour by younger children may even be recorded in a C&P intake rather than a YJ intake. All of this is another reason that future research could benefit from following a longitudinal cohort of participants as close in age as feasible.

Future research could seek to replicate the findings of the current study by considering other instruments, in order to explore whether the findings are generalisable to risk assessment instruments more broadly rather than just the YRS. Refining the items in instruments, and how they are weighted, would be possible and could be guided based on how well each item performs. Given that factors containing as few as three of the best CYRAS-YRS items were predicting reoffending fairly decisively (i.e. correlations above 0.3, $p < 0.001$), it would be highly plausible to conduct research on other instruments with a starting hypothesis that they would be expected to have some utility in predicting reoffending. Items on different risk assessment instruments often cover fairly similar content areas (e.g. past antisocial behaviour), since previous research has consistently found

risk factors related to these areas. It may be that the YRS is merely one of a number of instruments that could successfully predict reoffending using CYRAS records, and it would be useful to explore this. Furthermore, a number of different instruments could potentially be combined into one big instrument with a large number of items, and each item's performance measured as in the present study. In other words, not only does the present study demonstrate promise for the YRS in particular, it also demonstrates promise for using CYRAS or other computerised data records with other instruments.

Other instruments besides the YRS could be adapted for computerised research into risk prediction. There are several other risk factors (e.g. antisocial cognitions, lack of empathy, and lack of remorse) that were not covered by the YRS but which previous research indicates may be relevant to reoffending. The promise of this study's findings in not by any means limited to the CYRAS-YRS; on the contrary, these findings have substantial implications for the process of computerised data collection and research more generally. Overall, these findings suggest that this study has made a good preliminary sweep and that this is a promising avenue for further research.

4.7 Conclusions.

The present research has produced a number of substantial, positive findings. The main finding was that the CYRAS-YRS did, in fact, predict reoffending during the follow-up period. The most notable measure of this was a positive correlation of 0.311 ($p < 0.001$) between total CYRAS-YRS score and the reoffending measure for the 425 cases in this study. The CYRAS-YRS held up well in terms of both reliability and validity. The present study thus contributes to filling a gap in the risk assessment literature. The validation of the CYRAS-YRS by this study has perhaps been more extensive than any such validation for the Interview-YRS, and the present findings are quite important for the YRS as a whole. They demonstrate that the items on the YRS are capable of predicting risk of reoffending.

For the most part, the present study's findings were consistent with previous research. Multiple risk factors were shown to be involved, which mirrors the findings presented earlier in the Introduction, including the meta-analyses. Most of the items predicted reoffending; risk was clearly not limited to a small number of items. The present findings are both largely consistent with established research, plus they also fill gaps in the risk assessment literature. Specifically, this study's findings contribute original findings by validating the YRS, as well as demonstrating the feasibility of computerised risk assessment research. Furthermore, the oversampling of female offenders that was made possible by the computerised nature of the research produced a number of important findings. Most notably, the main findings of this study were shown to be applicable for both male and female offenders.

One of the most notable general limitations of this study was that the information on the CYRAS database had not been recorded specifically with research purposes in mind. Consequently, this information was not ideally structured for data collection and relevant information may have been missing in places. However, it is noteworthy that the study produced definitive outcomes in spite of this limitation. If government departments in relevant areas were to collect information in a more structured manner for research purposes (and the present study helps makes the case that this would be worthwhile), this study's methods could be further improved accordingly.

Overall, this study demonstrated the value of large sample sizes and made good use of the large sample size available to produce substantial results. The computerised method of data collection also enabled female cases to be oversampled, thus circumventing the usual practical difficulties in researching a decent sample size of female offenders. Computerised data collection from a national sample has sample size advantages both in general, and specifically for female offenders. The present study's success in predicting reoffending suggests that further research

involving computerised data records would be worthwhile, given the other advantages of this method of data collection, particularly the sample size advantages. This has been a groundbreaking study, with a number of substantive original findings, in addition to illustrating the wide potential for future research along similar lines.

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Appendix A

CYRAS-YRS Scoring Protocol

YO Name/ID:_____ DoB_____

Date referred_____ Age at referral_____

1) Any YJ system contact before this (date of referral) incident?

None	0
3 or less	1
4 or more	3
Any YJ FGC before age 14?	+2

(note: '+' means that points are added beyond those assigned for the score on the particular variable).

2) Is there an AWOL-from-home issue?

No	0
Once or twice	1
More than 2x	3

3) Ever take money from home?

No	0
Occasionally	1
Frequently	3

4) Ever expelled from school?

No	0
Yes, after age 14	1
Yes, at/before age 14	3

5) Ever been to adult court? [**See Court Record under "Intervention"]**

No	0
After age 17	1
Between 15-16yrs	3
Below age 15	5

6) Antisocial mates?

No	0
Yes	2
Gang assn?	+2

7) Truant from school? [**See Care & Protection**]

No	0
Yes	2
Yes, before Age 14	5

The next few questions concern Primary School years -- <=12 years

8) Impulsivity/recklessness—any evidence relating to primary school years?

No	0
Yes	2

9) Hyperactivity – any evidence relating to primary school years?

No	0
Some	1
Yes	3

10) Liar? (primary school age)

No	0
Occasionally	1
Often and skilful	3

11) Complaints from primary school teachers about behaviour at school?

No	0
Yes	2
Yes before age 10	5

12) Argumentative/ defiant (primary school age)

No	0
Yes	2

13) In trouble at primary school for rule breaking? [nonconformity

No	0
Yes	3

14) Police apprehension

Never	0
At age 14 or above	1
At age 11-13	3
At 10 or lower	5

15) Drug use

Not specially	0
Frequently – over 14	1
Frequently – before age 15	3

16) Theft from shops (school age)

No	0
Occasionally	1
Often	3

17) Offence frequency/severity **in past year**

Infrequent	1
Medium	2
High	4
Minor/low seriousness	0 (driving, drinking)
Medium (property)	1
Harm person or sold drugs	2

18) Alcohol/drug use

Light drinking/pot-smoking	0
Significant drink/drug use	3
Heavy drink/drug use	5

Appendix B

Appendix B

OLD VERSION

RISK SCREEN FOR YOUTH OFFENDERS

question set for young men aged 14 to 18 years **Itac-24**

The Risk Screen for Youth Offenders is designed to help you make decisions about the management of young male offenders between the ages of 14 and 18 years, inclusive. It combines answers given by the young person with answers from a "significant other" – someone who knew the youth well as a child. This information is then used to reconstruct the behavioral history of the youth offender, which gives you two pieces of important information. First, it identifies the 'behavioral trajectory' that the young person is following, and second it gives a total risk score, which indicates the probability of a further conviction in the following 12 months.

Introduction for significant other

Instructions and questions for the significant other are shown in the shaded boxes.

My name is [……..] and I work for [……..]. Right now I am doing an assessment of [name] who has been referred to me because ……. When I have finished my assessment [department] will decide how we can best help [name] to stay out of trouble in the future.

[name] has given me your name because you could help me to get a clear picture of his behaviour as a child and teenager. It is important for me to get a really accurate picture of how his behaviour has been developing since childhood for my assessment. If I have really accurate information about his behaviour I can make a better decision about what help he needs to stay out of trouble in future. You do not have to answer these questions if you do not want to. They will take about 20 minutes, and you can answer them over the phone. Will you help me with this? And is this a convenient time?

Before we start I need to emphasise that I am not collecting evidence to get [name] into trouble. I am looking for really accurate information that will help us to keep him out of trouble in the future. The information you give me is confidential.

Introduction for Offender:

Instructions and questions for the offender are shown in the un-shaded boxes.

My name is [……..] and I work for [……..]. I am going to ask you some questions about your behaviour during your childhood and teenage years. These questions are part of an assessment that will give me the information I need to make decisions about what I can do to help you stay out of trouble with the police in future. To do this I need to understand how your behaviour has been developing since you were a child, and your pattern of offending up until now. You can help me by giving honest and accurate answers to my questions.

Before we start I need to emphasise that I am not collecting evidence to charge you with more offences. This is about getting really accurate information about your behaviour so we can decide how to help you to stay out of trouble with the police in future.

	Scale 1	Scale 2	Scale 3	Scale 4
Question 1 (for significant other) Has […….] been involved with the youth justice system before? If yes, how many Family Group Conferences have been organised because of his offending? Scoring • None **0** • 3 or less **1** • 4 or more **3** If there was at least one Family Group Conference, was the first one before the age of 14 years? Scoring • No **0** • Yes **2** SCORE OUT OF 5			☐	
Question 2 (for young offender) Have you been involved with the youth justice system before? If yes, how many Family Group Conferences have been organised because of your offending? Scoring • Does not agree with answer to Q1 **0** • Agrees with answer to Q1 **1** SCORE OUT OF 1	☐			
Question 3 (for significant other) Did [……..] ever run away from home and stay out one night or more? Scoring • No **0** • Once or twice **1** • More than twice **3** SCORE OUT OF 3			☐	
Question 4 (for young offender) Did you ever run away from home and stay out one night or more? Scoring • Does not agree with answer to Q3 **0** • Agrees with answer to Q3 **1** SCORE OUT OF 1	☐			

	Scale 1	Scale 2	Scale 3	Scale 4
Question 5 (for significant other) As a child, did [name] ever steal money or other valuables from home? [YES or NO is all that is needed] Scoring • Does not agree with answer to Q6 **0** • Agrees with answer to Q6 **1** SCORE OUT OF 1	☐			
Question 6 (for young offender) As a child, did you ever steal money or other valuables from home? Scoring • Never **0** • Occasionally (less than once a month) **1** • Frequently **3** SCORE OUT OF 3		☐		
Question 7 (for significant other) Was [name] ever permanently excluded from a school? (not allowed to return?). If yes, at what age did this first happen? Scoring • Never expelled **0** • Expelled first after age 14 years **1** • Expelled first at 14 years or before **3** SCORE OUT OF 3				☐
Question 8 (for young offender) Were you ever permanently excluded from a school? (not allowed to return?) Scoring • Does not agree with answer to Q7 **0** • Agrees with answer to Q7 **1** SCORE OUT OF 1	☐			
Question 9 (for young offender) Have you ever been brought before an adult court, like a district court or a high court? (not a youth court) If yes, at what age were you brought before an adult court for the first time? Scoring • Never **0** • 17 years or above **1** • 15 or 16 years **3** • 14 years or below **5** SCORE OUT OF 5				☐

	Scale 1	Scale 2	Scale 3	Scale 4
Question 10 (for significant other) Has [name] ever been brought before an adult court, like a district court or a high court? (not a youth court) Scoring • Does not agree with answer to Q9 **0** • Agrees with answer to Q9 **1** SCORE OUT OF 1	☐			
Question 11 (for young offender) Think about the people who have been your good friends during the last year. How many are there? (No names needed.) Record number …….. How many of those have been in trouble with the police during the last year? Record number …….. Scoring • No friends in trouble with Police **0** • Less than one quarter **1** • One quarter or more **3** Are you or any of your good friends patch-wearing gang members? Scoring • No **0** • Yes **2** SCORE OUT OF 5				☐
Question 12 (for significant other) Is [name] or any of his friends a patch-wearing gang member? Scoring • Does not agree with answer to Q12 **0** • Agrees with answer to Q12 **1** SCORE OUT OF 1	☐			
Question 13 (for young offender) During your primary or secondary school years, did you ever stop going to school (truant) for more than one day? Scoring • Never truant **0** • Truant on one or two occasions **1** • More than twice **3** If 'more than twice' how old were you when that happened for the first time? Scoring • 13 years or older **0** • Before 13 years **2** SCORE OUT OF 5			☐	

	Scale 1	Scale 2	Scale 3	Scale 4
More instructions for significant other. I would like to ask you some questions about what [……] was like when he was at primary school and before that age. Remember that we need accurate and honest information so that we can help [.....] to stay out of trouble in the future.				
Question 14 (for significant other) Children sometimes do dangerous things because they do not stop to think about the consequences. How often did [name] behave like this? (Looking for impulsivity) Scoring • No more than other kids **0** • Sometimes, but not often **1** • Often, that's how he was **3** SCORE OUT OF 3		☐		
Question 15 (for significant other) During [name's] childhood, was he a very active boy – always on the go like he was driven by a motor? Scoring • No more than other kids **0** • Some problems with hyperactivity **1** • Often – it was characteristic behaviour **3** SCORE OUT OF 3		☐		
Question 16 (for significant other) At primary school age, was [name] a good liar? Scoring • No more than other kids **0** • Occasionally **1** • Lied often and skilfully **3** SCORE OUT OF 3		☐		
Question 17 (for significant other) When he was at primary school, did [name's] teacher ever speak to you about problems with [name's] behaviour at school? Scoring • Never happened **0** • Once or twice **1** • More than twice **3** If answer is "more than twice", did that conversation happen for the first time before [name] reached 10 years of age? Scoring • No, or don't remember **0** • Yes **2** SCORE OUT OF 5		☐		

	Scale 1	Scale 2	Scale 3	Scale 4
Question 18 (for significant other) Some children argue with adults and refuse to do as they are asked. (Un-cooperative and defiant) Was [name] like that as a primary school child? Scoring • No more than other kids **0** • Occasionally **1** • Often – that's how he was **3** SCORE OUT OF 3		☐		
Question 19 (for significant other) At primary school age did [name] get into trouble a lot for breaking rules? Scoring • No more than other kids **0** • Sometimes, but not often **2** • Often, that's how he was **4** SCORE OUT OF 4		☐		
Question 20 (for young offender) How old were you the first time you got put into a police car because you had been picked up for something? Scoring • Never been put in police car **0** • At age 14 or above **1** • Between 11 and 13, inclusive **3** • 10 years or below **5** SCORE OUT OF 5			☐	
Question 21 (for young offender) How old were you when you started using drugs whenever you could get some? Scoring • Never used drugs **0** • At age 15 or above **1** • 14 years and below **3** SCORE OUT OF 3			☐	
Question 22 (for young offender) When you were of school age, did you ever steal stuff from shops or supermarkets? Scoring • Never stole from shops **0** • Occasionally, but not regularly **1** • Regularly -once a month or more **3** SCORE OUT OF 3			☐	

	Scale 1	Scale 2	Scale 3	Scale 4
Question 23: Self-reported offending (for young offender) I would like you to count up in your head the number of offences you have done in the last year, and tell me the number. Scoring • 1 or 2 **0** • 3 or 4 **1** • 5 to 7 **2** • 8 to11 **3** • 12 or more **4** I would like you to think of the most serious offence you did during the last year and tell me about it. Scoring • Driving, used drugs or alcohol **0** • Property offences only **1** • Harmed person or sold drugs **2** SCORE OUT OF 6				
Question 24: Drug and alcohol use profile (for young offender) On how many days during the last week did you drink some kind of alcohol? ……. How many standard drinks do you have on a standard drinking day? ……. How often have you used during the last month? …… What kinds of drugs were they? …… SCORE OUT OF 5				

	4 days or fewer	5 days or more
5 drinks or less	0	2
6 drinks or more	1	3

	Less than 4 occasions	Four or more occasions
Pot only	0	1
Any other drug	2	2

	Scale 1 total	Scale 2 total	Scale 3 total	Scale 4 total
Total up the scores in each column and record totals in the boxes. Then transfer scores to the scales below.				

summary information

remove and file this page

Case no..... Date..... Age.....

Client name.....

Assessor .....

Significant other .....

Decision .....

Total risk score =

SCALE ONE SCORE	
6	Good
5	Adequate
4	Poor – get more
3	
2	
1	
0	

SCALE TWO Disruptive behaviour ages 4 to 10	SCALE THREE delinquent behaviour ages 7 to 14	SCALE FOUR adolescent offending ages 10 to 18
24	24	24
20	20	20
10	10	10
0	0	0

Scores consistently in this range – at risk of chronic adult offending

Scores consistently in this range – probably casual offenders